



FRIDAY, MARCH 12.

Train Rules in 1845.

Now that a committee of the General Time Convention has in hand and is earnestly engaged in the arduous work of compiling a code of Uniform Train Rules, it is well to look back and see what the Fathers did in the early ages of the development of the science of railroading.

We are indebted to Mr. L. M. Cole, General Ticket Agent of the Baltimore & Ohio Railroad, for a copy of a time-table issued on the Washington Branch of that road in 1845, containing the train rules then in force, which we reprint by permission. They are worthy of attentive perusal:

INSTRUCTIONS.

"First.—No train will leave a station, under any circumstances, before the time specified in the time-table has fully expired.

"Second.—In cases of detention to either of the trains, the one arriving in time at the appointed place of meeting, will wait half an hour beyond the time fixed by the time-table for its departure, and then proceed at the established speed, taking care to keep half an hour behind, or later than the time fixed, for its arrival at the several stations, until the train out of time is met or heard from.

"Third.—The Conductor of the train out of time, will, if his detention has been temporary, and his Engine not disabled, proceed at the established speed until he reaches a station within not less than one hour's run of the approaching train and there lay off for its arrival (or in other words he must attain the station one hour before the time fixed by the time-table for the arrival of the approaching train at that point, and immediately dispatch a messenger to give notice of his position to the approaching Conductor. In cases where his engine, or the cars of his train are so badly disabled as to render it impossible to proceed without aid, he will immediately send notice to the Conductor of the approaching train, and also dispatch a messenger to the nearest point from which the necessary assistance may be obtained to enable him to proceed.

"Fourth.—In the event of both the trains being delayed, messengers will be immediately dispatched from each, and will proceed until they meet; and after having determined on the point at which the trains shall pass, which it will be their duty to do, they will return to their respective Conductors and give notice of the arrangement.

"Fifth.—Conductors of tonnage trains must in all cases keep out of the way of passenger trains. Nor must they leave a station where a passenger train is due without first having received positive information of its position, and then only in cases where the assistance of their Engine is wanted to enable the passenger train to proceed. Furthermore, it is particularly enjoined upon the Conductors of tonnage trains, that in cases of inability to reach the designated points of meeting, as shown by the time-table, they will lay off at some siding at least one hour's run from the supposed position of the approaching train or trains, assuming them to be in time; and if from any cause a tonnage train is compelled to come to a halt, or moves at an unusually slow rate, and it is known to the Conductor that an Engine is approaching on the same track he will send a messenger some distance in the rear or in advance, as the case may be, to give notice of his position.

"Sixth.—It shall be the duty of the Enginemen to sound their whistle on approaching all depots, water stations, switches and road crossings, most especially the crossing of the Washington Branch Road at the Relay House, at such speed as will admit of a prompt stoppage of the Engine on discovering any obstruction on the track or displacement of a switch.

"Seventh.—The Conductors both of passengers and tonnage will be held individually responsible for the speed of their respective trains, which must in no instance, and upon no pretext, either to make up time or otherwise, exceed that prescribed by the time-table. Any deviation from this speed, or from the regulation which requires the Enginemen to approach all switches, water stations, depots, etc., at such speed as will admit of a prompt stoppage of the engine on discovering a switch out of place, or any obstruction on the track, must be promptly reported to the Superintendent.

"Eighth.—Conductors of trains, after having used a switch, must under no circumstances leave it unlocked; provided it be furnished with a lock.

"Ninth.—The clock at the Pratt street depot in Baltimore shall be taken to be the standard time, and all conductors of passenger trains, before departing from Baltimore with their trains, are required to have their watches regulated and compared with that clock, and to see that the clock at Washington depot conforms to the standard time.

"THE COMPANY have been advised by their Counsel, that if death results from collision or other accident, consequent upon a violation of the above regulations by the person in charge of the train, MANSLAUGHTER will have been committed, subjecting such person to confinement in the penitentiary not exceeding ten years."

As the debating society provided for in the fourth rule may not in all cases have arrived at a decision by virtue of the forces of reason, it may be presumed that train-hands with superior natural powers of locomotion and with muscles and fists of persuasive size were at a premium in the service of ambitious conductors anxious to get their trains over the road.—Official Railway Guide.

The Douglas Curve on the Baltimore & Ohio.

Rev. George Morrison thus describes in the Baltimore Sun an interesting point on the Baltimore & Ohio's new line to Philadelphia, about 12 miles distant from Baltimore:

Following the contour of the bluffs of the Chesapeake Bay and its tributaries until the same of the Delaware Bay are reached, from Baltimore to Philadelphia there is a water-shed from 200 ft. and less above tidewater, broken by the Big and Little Gunpowder and the Susquehanna rivers, etc., and it is along this shed that the most direct and available line for a railway was adopted by the B. & O. system. The construction by a large force has been in progress for two and a half years.

This deflection or curve was adopted so as to traverse the bluffs of the Gunpowder and avoid a tunnel, so obnoxious to travelers. The cut is 3,000 ft. long, with a mean depth of 45 ft. The quantity of material taken from the cut to make a fill of over 3,000 ft. at Morrison Grange is about 320,000 yards, and the mean height of the fill is 40 ft. The fine bridge over the Gunpowder River is an iron deck bridge of 160 ft. span, some 75 ft. above tide. The two abutments are tremendous structures, each with two arches 50 ft. high. The foundations are about 30 ft. deep, and the whole structure is about as solid as the hills adjacent. This immense work of the segment in question has cost the company in the construction and superstructure not less than \$350,000. Col. H.

T. Douglas is the Engineer in Chief, with Col. J. L. Randolph, Consulting Engineer; Maj. R. Conway Howard, Division Engineer, and Messrs. Edward Potts, Jr., Calvin Whitely, Jr., and J. Malcom Douglas, Assistants of the Chief. As the road will soon be in shape to open up to the public, there are some scraps of history which couple with points in view, and are coterminal to the Douglas curve. At the point of grade where the immense cut passes to the fill there is a slight plateau, at which point the road system of that locality converges. Within a radius of this point of five miles at the time of our revolutionary struggles there were resident many who took part in the contest for our national independence. At the Gunpowder River end of the Douglas curve is the point crossed by the Continental Army under Washington, as it was transferred southward to Yorktown, Va. Then there were 16 ft. of water, and subsequently a wharf for vessel traffic at the point where now stands the magnificent bridge structure. For purposes of the city water supply, now all the water franchises of the Gunpowder belong to Baltimore. There are the ruins of the once well-known Patterson mill works. They were owned by William Patterson, the father of Mrs. Bonaparte, and the grandfather of Edward Patterson, Jr., Charles Bonaparte, of Baltimore, and S. S. Patterson, of Long Green, Baltimore County, and others, the heirs of his estate. From that once shipping point, within the period of one-half of a century the river flow has filled up to the bay, a distance of 12 miles, so that the Gunpowder is no longer navigable to any commercial craft.

The Durability of English Locomotives.

By the courtesy of Mr. Dean, of the Great Western; Mr. Johnson, of the Midland; and Mr. Strouley, of the London & Brighton Railway, we are enabled to supply information of a kind which has never before been made public on this important question. It will be seen that the figures have been put into a somewhat different shape by each of the three gentlemen named. Mr. Dean has had the mileage between shop repairs for the year 1885 of the first 20 engines of five different classes put together for comparison in the following table:

Average Mileage of Locomotive Engines between Shop Repairs, Great Western Railway.

CLASS.	Mileage.		
	Highest.	Lowest.	Average.
Passenger engines—			
7 ft. express engines, single driving wheels.....	71,400	24,000	52,000
6½ ft. coupled express engines.....	79,600	21,000	54,200
5 ft. coupled tank engines..	94,000	25,000	48,000
Goods engines—			
Six wheels coupled tender engines, 5 ft. wheels.....	68,300	17,300	42,200
Six wheels coupled heavy saddle tank engines, 4½ ft. wheels.....	55,700	17,000	33,500

These engines were taken just as they happened to come on the books. Some were in better condition at the beginning of 1885 than others, and the repairs named do not refer to breakdowns alone, but to wear and tear as well.

Mr. Johnson, of the Midland Railway, confines himself to breakdowns. In 1885 there were 60 cases in which an engine was rendered idle for half a day or more. Among the causes was the breakage of crank and straight axles, slide valves, and valve spindles through wear and tear; also cases of hot guide bars, due to neglect on the part of drivers; and cases where drivers had to give up their trains. The gross engine mileage for 1885 was 43,657,427. The total number of engines 1,803. The average mileage, supposing all the engines to have been worked, 24,200. There was one breakdown for every 727,624 miles. This includes engines of all kinds. Portions of the line are exceptionally heavy, and the trains run are the heaviest and fastest in the world.

Mr. Strouley has supplied us not only with general figures, but with minute particulars of the nature of the casualties which caused the engines concerned to be idle for half a day or more, the six months July-December, 1885. There are over 400 engines on the line. Here are the particulars:

July 25.—Engine 228 caused 43 min. delay through eccentric straps getting hot—short of oil—breaking eccentric rod.

July 31.—Engine 202 caused 32 min. delay through left-hand cross-head breaking.

Aug. 1.—Engine 13 caused 24 min. delay through steam pipe flange breaking off.

Sept. 14.—Engine 38 caused 11 min. delay through tube bursting.

Sept. 16.—Engine 75 caused 10 min. delay through tube bursting.

Sept. 28.—Engine 291 caused 8 min. delay through tube bursting.

Sept. 28.—Engine 256 caused 50 min. delay through crank axle breaking.

Oct. 9.—Engine 73 caused 28 min. delay through valve spindle cotter coming out.

Oct. 31.—Engine 100 caused 1 hour 40 min. delay through tube bursting.

Nov. 9.—Engine 425 caused 2 hours 57 min. delay through broken tube.

Nov. 14.—Engine 419 caused 2 hours 13 min. delay through tube bursting.

Nov. 19.—Engine 93 caused 1 hour delay through draw-bar of engine breaking, in consequence of two couplings being put on at once.

Dec. 2.—Engine 336 caused 57 min. delay through quadrant link breaking. This link had flared in case-hardening, which was not observed until it broke.

It will be seen that some of these failures are of the most trifling character, and that the majority involved no repairs more serious than plugging a tube. There is not one record of a broken spring as having interfered in any way with the traffic. The eccentric straps, which were allowed to run hot from want of oil, broke the eccentric rod; but this can hardly be put down as a fair case against the engine, as it had been running perfectly for several years. The crosshead recorded as broken had evidently been strained in putting in the gudgeon, owing to the block going into the jaw for supporting it not having been a sufficiently perfect fit. This crosshead had been working for several years holding on by one side only, but this was not discovered until it broke. It did but trifling damage, but of course stopped the engine for the day. The crank axle which broke caused 50 minutes' delay, but did no other damage. The valve spindle cotter was allowed to work out from one of the small engines. This had evidently been taken out for some purpose, and had not been properly secured again. No. 336 engine broke the quadrant link, which, in turn, broke the eccentric rod. This quadrant link had, as before stated, flared in case-hardening, but flaw was not observed until it came asunder. It appears that on the Brighton line they almost never have any failure of the gear of the engine itself, the troubles being confined to

broken crank axles and burst or broken tubes. The mileage is not easy to get at in a compact form, because there are 74 old engines and 338 of the new type, and it is not fair to include old locomotives which are being replaced. The total engine mileage for the half year was 4,986,893, and assuming that all the engines ran alike, which is not fair, however, to the standard engines these made 4,087,000 during the half-year; or supposing all the engines to be in use, which is not the case, 15,110 miles per engine per half year, or 30,230 per annum—a high average. Supposing the number of break-downs for the year to be twice that for the six months, or twenty-six, we have nearly 315,000 miles per break-down. There were, it will be seen from the list, only three accidents properly so called, namely, one crank axle broken, one link and one crosshead. Dividing the mileage by three, we have one serious breakdown to every 1,362,333 miles run.—The Engineer.

Locomotive Performances on the Elevated Railroad.

The following figures on the above subject are given in a paper read by Mr. Frank J. Sprague before the Boston Society of Arts and published in the *Electrician and Electrical Engineer*:

The main line of this road, from South Ferry to Harlem, is 8.48 miles long. The following are details of this line, not including the branches at City Hall, Thirty-fourth and Forty-second streets:

Length of line.....	8.48 miles
Total lift, up grade, up track.....	144.42 ft.
Lineal distance for same.....	13,160 ft.
Total lift, up grade, down track.....	137.60 ft.
Lineal distance of same.....	16,510 ft.
Level on each track.....	15,100 ft.
Number of stations.....	27
Number of stoppages.....	20
Number of stations at which stops are made at level or up grade, each track.....	20

Average times:

Single trip.....	42 minutes
Per station.....	97 seconds
Underway.....	80 seconds
Stop.....	17 seconds

When getting away from a station an engine exerts for a short distance a nearly continuous traction, which soon begins to decrease, until, when it has run about 130 ft., it has gotten up to a trifle over half speed, at which time it is doing its full work per second, this work being expended in accelerating the speed of the train and in traction.

A nearly uniform acceleration of speed of about 1 ft. per second extends over a lineal distance of about 130 ft., and about 16 seconds of time. The engine is now working to its full capacity, and the train is running at a decreasing rate of acceleration, the work remaining the same until the maximum speed of about 29.1 ft. per second (19.2 miles per hour) is reached about 625 ft. from the station.

When the full speed is reached the work suddenly falls off, as does the traction, because energy is no longer stored up in the train, but simply expended in traction. This continues until within about 289 ft. of the station, when brakes are applied and the train brought to a rest. This distance of 289 ft., about once and a half the length of a train, the maximum speed obtained, the distance traveled over, and the running time between stations, are mutually dependent.

This description is based on a level between stations, and the grades entirely change it, but it suffices for illustration.

With the above assumption, the distances are as follows:

Average between stations.....	1,722 ft.
Divided nearly as follows:	
Getting up to a little over half speed.....	135 ft.
Hence to full speed—about.....	495 ft.
Full speed.....	808 ft.
Slowing to stop.....	289 ft.

The average speed in miles per hour:

Getting under way.....	13.4
Full speed.....	19.2
Slowing to stop.....	9.6
Mean between stations.....	14.7

Distance traveled while slowing to stop:

At 20 stations.....	5,780 ft.
At 6 stations.....	1,634 ft.

The daily work of one engine is at present as follows:

Round trips made.....	9
Coal used.....	5,760 lbs.
Hours on duty.....	20
Hours steam on.....	6
Average consumption of coal per trip.....	640
Total horse-power per round trip.....	6,184
Horse-power per pound of coal.....	9.66
Pounds of coal per horse-power per hour.....	6.21

The amount of steam used in braking, the slowing down and speeding up again when following close to other trains, and the losses while standing still both from radiation and escaping steam, are all neglected, and these items will reduce the coal expenditure to less than 6 lbs. per indicated horse-power. Since it costs about \$4 per gross ton to put the coal on the engines, and they use 640 lbs. per round trip, it will be seen that the coal expense is only about \$1.17 per round trip, including waiting time, an average of 2½ cents per station. One additional passenger at every other station during commission hours, or one every fourth station at other hours, would pay the coal expenses of the trip. From this it will be seen how important it is to increase the carrying capacity, whether with or without an increase of coal expended.

The Pennsylvania Railroad's New Stock.

In answer to questions put by stockholders at the annual meeting of the Pennsylvania Railroad Co. in Philadelphia on Tuesday, President Roberts made some remarks of interest, which are reported by the *Philadelphia Ledger* as follows:

President Roberts said he felt it due to the stockholders that he should speak on certain points which had been raised. "The company had calls at all times for increased capital. If it should ever happen that the company should arrive at the point when it did not want more money for its capital account, at that moment would the company commence to decay. The necessity for the building of new lines and extension of existing systems and the providing of capital must be apparent to every reader of this report. Now capital can be provided in two ways, either by increasing the bonded indebtedness of the company or by issue of stock. To do this the management must derive its authority from the shareholders. The issue authorized in 1881 is nearly exhausted. A large portion was made in the purchase of the stock of the Philadelphia, Wilmington & Baltimore Railroad; a portion of the balance was allotted to the shareholders, and some still remains. Just how much this balance is will be shown by the books of the company, but it has run down to such a small amount that it was thought wise to have authority to issue such an additional amount as may be needed to extend our system or to meet such exigencies as may arise. As to

* Reference was made to this paper in our last week's issue.

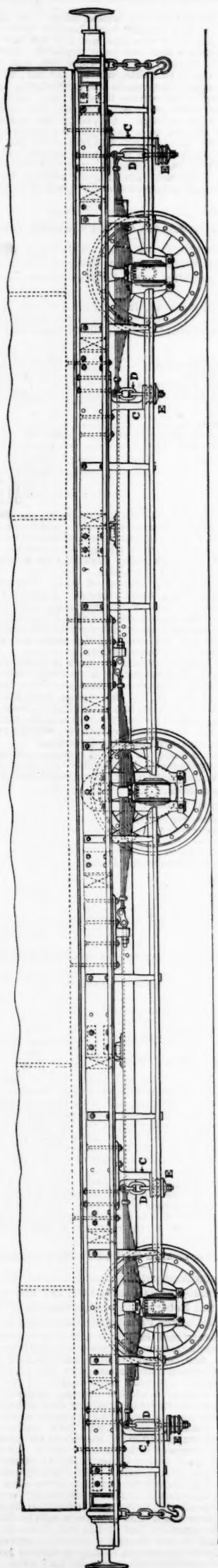


Fig. 1

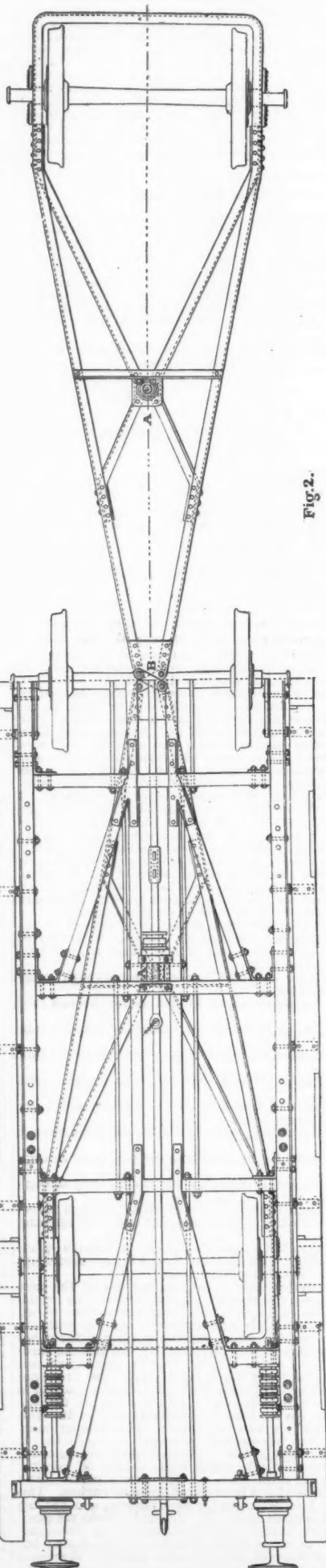
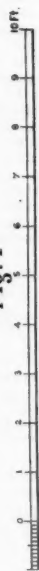


Fig. 2

GROVER'S FLEXIBLE WHEELBASE.

consulting the stockholders as occasion may arise, I will say that we have no means of getting the stockholders together. It requires one-tenth of the stockholders to unite in a call, and it is practically impossible to get that. Should anything occur which would make it necessary to extend the system, a stock capital could be better used. Whether the privileges you have given to the management in this respect have been wisely used, or whether they have been abused, you must determine. If the privileges have been abused by the present management it is your duty to turn them out.

"We will ask what is for the best interests of the shareholders, and the privileges you grant will be used to that end. Some remarks have been made upon the uses of the capital of this company. That issued in 1881 was for the purchase of the Philadelphia, Wilmington & Baltimore Railroad. In the resolution before you it is proposed that no action shall be taken without the consent of shareholders being first had and obtained. It is idle to conduct affairs with such a restriction as that. If it had been in force you would not have owned the Philadelphia, Wilmington & Baltimore. Whatever some persons may think about that purchase, I am clear in my own mind that it was a wise thing to do. I couldn't have waited three minutes to determine whether to take it or not. It must be remembered that we were dealing with men who had other and eager purchasers for their stock and we had to act on the instant. Something of this kind is apt to occur in nearly all the large operations of the company, and when the shareholders feel that they cannot trust the board of directors it is wise not to change the plan, but to change the management. But that the management must be clothed with such authority to act promptly is very clear."

President Roberts then spoke of the Schuylkill Valley Railroad. "For the past three or four years," he said, "it is well known that the country has been beset with all sorts of speculative railway enterprises, many of them promoted solely to injure this company's property and as standing menaces to its value in the future. One well recognized way to defend our interests when we are robbed of traffic in one direction is to endeavor to secure it in another, and I have found that since the Schuylkill Valley line was constructed, even if it should not pay one penny of return, it has been of more value than its cost twice over. It has cost more anxiety to the management than to any shareholder. I would like that whatever board of directors you elect at the next annual election it be given full and proper authority to acquire money which the charter of the company permits to be acquired, and that its disposition be left to the wisdom of the management."

General Wagner asked what was the present limit of capital of the company.

President Roberts: "One hundred and fifty millions. It is now \$94,777,850. There are about \$3,000,000 authorized, but not yet issued, and this, with the \$15,000,000 now asked for, will make the amount which will be authorized \$18,000,000. The temptation is very great just now to issue bonds, so that every inducement should be offered to increase the share capital, upon which no dividend will have to be paid unless it is earned."

In answer to a proposal to sell the United New Jersey stock held by the company, President Roberts said that the capital stock of the United Companies of New Jersey "was a debt of the company, and that the selling of it was the same as issuing the bonds of the Pennsylvania Railroad Co. If we sell at 250 we would be simply borrowing at 4 per cent. per annum. If we have assets upon which the company is not bound to pay interest, it is always policy to sell, those only being held which are necessary to maintain the entirety of the system, or which produce interest larger than we could get in any other manner."

Grover's Flexible Wheelbase.

Several systems of flexible wheelbase have been introduced in England, and many cars fitted with a compromise between a rigid wheelbase and a pair of trucks have been built in that country and exported to her colonies and South America. The term "flexible wheelbase" needs a little explanation. The first railroad cars, both for passengers and freight, were built in close imitation of those built for running on highways, and had therefore only four wheels, mounted, however, unlike road vehicles, with rigidly parallel axles. That form of construction was soon abandoned here, but became firmly established in Europe. Gradually longer vehicles with six wheels were introduced, and in 1863 some vehicles with eight wheels not arranged in trucks, but all having a certain amount of side movement, were built for the Metropolitan (underground) Railway. The cars were in other respects a great advance upon any others that had gone before, being better upholstered, and giving more space to the passengers in every direction. Their motion was, and is, remarkably smooth, for these cars are still running after having conveyed a fabulous number of passengers. The introduction of these improved cars, designed to attract people to take a journey through the horizontal chimney known as "The Underground" railroad, gave an impetus to a rapid widespread improvement in the comfort of cars for passenger service. The improved cars were, however, too large and heavy to be carried on four wheels, and accordingly six wheels arranged with parallel axles, the end axles having a little side play, became a very usual arrangement. The size of cars still continued to increase, and as about 18 ft. was found to be the limit of the rigid wheelbase, either eight wheels must be used, or the six wheels must be arranged to give a flexible wheelbase. Many roads adopted the former alternative, either like the Midland taking the American truck in its entirety,* or like the Great Western designing a somewhat simpler form of truck. Other lines were unwilling to try eight wheels until they had endeavored to get equally good results from the use of a smaller number. On the whole, experience has been decidedly in favor of trucks, and they are more or less used on the best express passenger stock of nearly every important line in England with a few exceptions, of which the London & Northwestern is the most important. While the six wheels arranged in a flexible wheelbase run smoothly round curves at high speed, they occasionally leave the tracks while switching, especially on turnouts laid, as is usual in England, with reverse curves. The reason is that, as will be seen from the following description, all the axles are so connected together that when one radiates to a curve the others must radiate to the same curve, consequently, when one end axle

* See illustrations of composite car for this road in *Railroad Gazette* Aug. 25, 1876.

stands on a right-hand curve, and the other end axle on left-hand curve, some disagreement takes place, and if a bad frog or a low joint be encountered when moving at a slow speed, one of the wheel-flanges being pressed hard against the side of the rail is apt to mount, and so cause the car to leave the track. Another disadvantage is that a six-wheeled car with a 20-ft. wheelbase and without any equalizing device between two of the axles, will not ride well over a rough or hummocky track, or when the journal bearings are unequally worn. If a six-wheeled car with a 20-ft. wheel-base stands with the middle wheels on the apex of two grades of 132 ft. to the mile (and short pieces of such a grade are not uncommon in badly kept up track), the rail under the end wheels will be 3 in. lower than under the centre wheels. This means that practically the end wheels will be entirely relieved of the weight of the car and the middle wheels will sustain it all. This necessarily imparts a disagreeable motion to the car and strains it.

The use of six wheels permits the use of a lighter and smaller car, which is often advantageous where horses are used for switching, and where it is desirable that no one car be too heavy to be moved by a horse. In freight, especially on narrow-gauge roads with a thin traffic, small cars present certain obvious advantages, and it is, therefore, not surprising that a large number of freight cars on both the Grover and Cleminson systems have been built for use on narrow gauge lines in India, South America, etc.

The two principal systems of flexible wheelbase which dispense with trucks are the respective inventions of Mr. J. W. Grover and Mr. James Cleminson.[†] The accompanying illustrations represent a "composite carriage" (combination car) 42 ft. long, with the running gear arranged according to Mr. Grover's patents. The centre wheels are fixed to the underframe in the usual way adopted in rigid wheelbase vehicles, viz., by "axle-guards" or pedestals in which the journal boxes slide vertically, the bearing springs being attached to the underframe by scroll irons, adjustable tee-bolts and shackles, as shown, consequently these wheels have no lateral movement. The two end wheels, however, are secured by the horn-plates and journal boxes to separate axle-frames made of angle iron, shown in plan on the right side of fig. 2, and constructed to pivot upon centre pins A A, fixed half-way between the centre and end wheels. The two axle-frames are connected together at the centre line of the carriage by a pair of links B, as shown on drawing. The end bearing springs are not secured to the axle-frames, but to the underframe by means of long, vertical bolts C C, and links D D, carried by stirrups, rubber springs E E being introduced beneath the latter. This arrangement of fixing the spring—which has also latterly been introduced into the rigid wheelbase of the London & Northwestern and many other companies' six-wheel vehicles—gives the necessary lateral play required to allow the wheels to follow the curves, and also tends to bring the axle-frame back and keep it in a central position when on a straight line. It will be seen then that the end axles have an equal but contrary movement off two centres, which, while giving them true radiation, still keeps the vehicle as firm and stiff upon the road as ordinary rigid stock. Grover's system has lately been introduced upon tram cars for steam tramways in England.

Improved Car Seat Arm.

The accompanying illustrations represent an improved form of seat arm which is simple and confers many advantages. As the arm can form an angle with the back, the total width of the latter can be reduced several inches, thereby gaining more room between the seats for the feet and baggage, without reducing the height from the top of the cushion to top of the back.

As will be seen from our illustration, fig. 1, the arm is locked when the seat back is reversed and in position. The act of moving the back to reverse unlocks the simple catch, and the back can then be thrown over and assume a fresh angle with the arm, and when it is finally in position, falls, and is locked to the arm again.

On referring to fig. 1 it will be seen that the seat arm is made in two pieces jointed together. Two lugs project from the face of the part attached to the back and two notches are cut in the end of the part attached to the seat end arm. The two parts of the seat arm are locked together when one of these lugs engages with one of the notches. The back being lifted in the act of reversing, the lug is lifted out of the notch and the two portions of the seat arm are free to change their angle with one another. When the back is turned over, the arm is arrested by the usual stop. The back continues to fall and is consequently locked as shown in our illustration, the lug falling into the notch.

In figs. 2 and 3 two standard Pennsylvania seats are shown placed at the standard distance—36 in.—apart. The front seat, fig. 2, shows in solid lines the improved arm and back, the old back being shown in dotted lines. Fig. 3 shows the existing Pennsylvania seat. It will be seen that the height of the two backs is identical, and that the support given to the passenger is almost exactly similar, except that the new back is slightly more hollowed out near the seat cushion. This is an improvement, as it gives more room for a lady's dress, which generally is somewhat full at this point. The new form of back, therefore, appears to add to the comfort of the passenger using it. The passenger sitting in the hinder seat is even more benefited. The space between the full and the dotted lines represents the difference between discomfort and ease to many who, like the writer, have the misfortune (?) to be possessed of long legs, the gain in room for the knees is very manifest. The backs being lighter and smaller, a con-

[†] The latter system was illustrated in the *Railroad Gazette* of March 15, 1878.

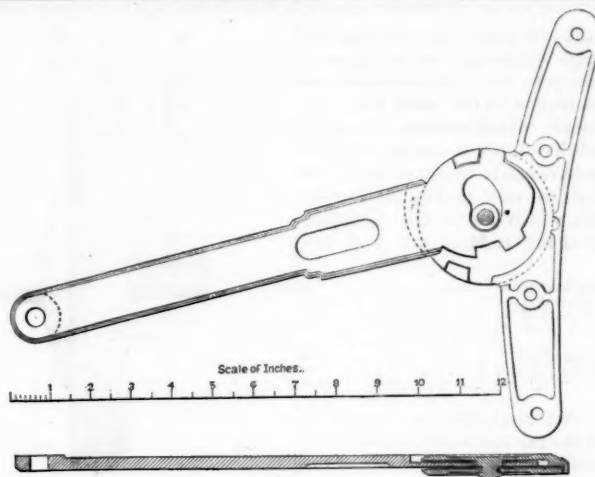


Fig. 1.
IMPROVED CAR SEAT ARM.

siderable saving of cost is effected, the diminished quantity of push required being considerable when fifty or a hundred cars are required. The Pennsylvania are trying their invention on a large scale, some 30 cars now running being fitted with these arms.

Any further information can be obtained of the Hale & Kilburne Manufacturing Co., Philadelphia.

Contributions.

Substitutes for Engineers' Chains.

TOLEDO, O., March 8, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In my reply to C. Hain's inquiry for a substitute for the 100 ft. steel chain, the word "three" in fourth line from the bottom (issue for March 5) is an error. The "good substitute for a chain" which I recommended is simply a single ribbon band with detachable handles, and not "three" ribbon bands.

C. BUXTON,

Chief Engineer Toledo & Ohio Central Railroad.

Bridge Specifications.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the *Railroad Gazette* of the 5th inst. I notice that various bridge companies have sent out general invitations to railroad managers, etc., to meet in Pittsburgh with a view of modifying, omitting or changing several requirements in bridge specifications.

Among some of the additions which should be made, there is one which is of sufficient importance to attract the attention of those interested in bridge calculations.

Having been engaged in the drafting room of several bridge companies in calculating stresses, I was surprised to observe the different conditions of loading maximum stresses in bridge members. One company, for instance, assumed that the maximum shear in web obtains when the centre of gravity of the four drivers of a Consolidation engine is over the panel point in question, regardless of whether the maximum in end post or intermediate posts was sought. Another assumed, more correctly, that the maximum in end post obtains when the third driver of a Consolidation engine is over the first panel point, whereas the maximum in intermediate posts obtains when the first driver is at panel point, neglecting the negative shear due to the increment from truck. The same may be said in regard to stresses in the chord.

An example of the difference which these assumptions cause in the strain sheet of a bridge is offered at every bridge letting. It is a very rare occurrence that strain sheets for one and the same bridge agree, although the same "live load" diagram may have been assumed (the difference in the assumption of the "dead load" notwithstanding).

Should not some provision be made in specification which would cover this point and obviate such ambiguity?

BRIDGE ENGINEER.

[The most rational plan for obviating such ambi-

guity is that proposed by a prominent bridge engineer in a recent paper before the American Society of Civil Engineers, to abandon altogether the practice of computing strains from a given actual wheel-base, and assume a certain uniform load per foot with a single concentrated load for the locomotive wheel-base. This would tend to uniformity, and in the unavoidable uncertainty as to what the actual loads will be which the bridge will have to sustain, would save much rather worse than useless labor.—EDITOR RAILROAD GAZETTE.]

Graduation for Level and Stadia Rods.

ROCKLAND, Me., Feb. 22, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Noticing the articles on level rods in the *Gazette*,* I send sample of rods which I have used the past three seasons with entire satisfaction. It gives a direct reading to 0.01, and with a good telescope I have never had any difficulty in reading it as far as I ever allow myself to use any rod on accurate work. I have read it 600 ft. each way from the instrument in running test levels, though I almost always take 500 ft. as the maximum distance allowable in such work.

The rod recently figured in the *Gazette* appears to be a very good design, and I will try a rod graduated in that manner.

O. H. TRIPP.

Swedish Tests of the Efficiency of Joints.

JERSEY SHORE, Pa., Feb. 16, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

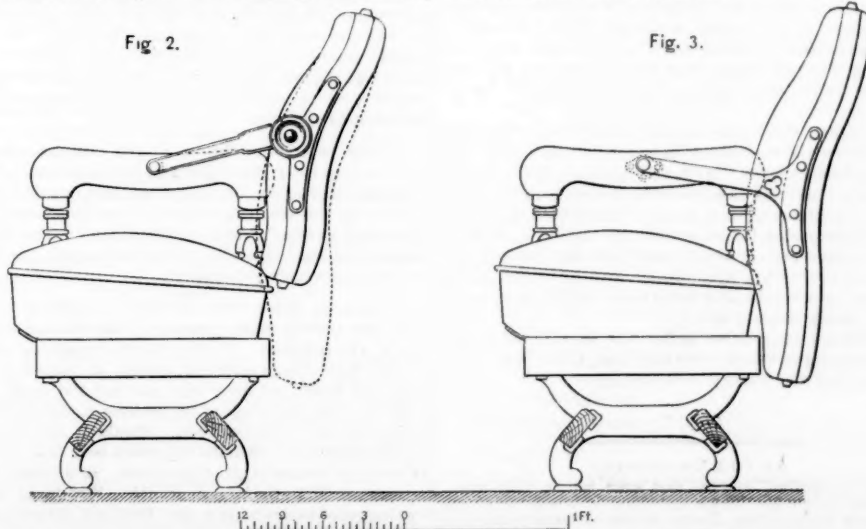
In Mr. Sandberg's recent paper on rail-joints, published in your last issue, I notice in Mr. Elworth's table of Swedish tests a very marked difference in the results obtained from one plain fish-plate and one angle-plate, the table seeming to show a decided advantage in placing the stronger plate on the inside of the rail.

Is this a fact confirmed by a larger percentage of broken inside angle plates in this country?

W. C. WETHERILL.

[In some observations of Mr. Emile Low, published in the *Railroad Gazette* of March 6, 1885, it was shown that as many as 22 out of 28 broken angle-bars were on the two exterior rails of two miles of double-track

* See issue of Feb. 12, 1886, page 109.



IMPROVED CAR SEAT ARM, APPLIED TO PENNSYLVANIA RAILROAD STANDARD SEATS.

road, and only six on the two inside rails, showing the great advantage of stable surfacing; but we know of no satisfactory evidence as to the relative number of inside and outside bars broken on the same rail. No reason is evident why there should be much difference.

Mr. Elworth's records hardly show enough contrast in the matter above referred to to insure that it is not merely accidental. This we may readily observe by comparing the records, which are worth repeating. The per cent. of battered rail ends in last 3 of five years' wear was:

Plain fish-plates with ribbed base-plate.....	6.4
Angle fish-plates, on both sides of rail.....	14.4
" outside only of rail.....	29.6
" inside " " ".....	20.0
Deep fish-plates, on both sides of rail.....	17.6
" outside only of rail.....	22.4
" inside " " ".....	20.8

Here the evidence that angle bars or deep fish-plates on both sides of the rail are much better than a single angle-bar or deep fish-plate on either side of the rail only, and a plain fish-plate on the other, is very plain, and can hardly be due to chance errors. The evidence that the plain fish-plates, when reinforced by the ribbed base-plate of the Fisher type, is more effectual than either, is still plainer, if the tests were properly conducted. The evidence that it makes any difference on which side of the rail the single plain fish-plate is placed is so doubtful as to be of no real value.—EDITOR RAILROAD GAZETTE.]

The Train Dispatchers' Board.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Appleton's conclusions concerning the "train dispatchers' board," illustrated in your issue of the 19th ult., in connection with Mr. Turner's work, on the "Telegraph as Applied to Train Movement," are correct.

Subsequent to the time that the description of the original board was written, it was improved as shown in the cut, at the suggestion of W. M. Eggleston, Chief Train Dispatcher of the Jeffersonville, Madison & Indianapolis Railroad. The improved board is reversible, "a. m." trains being placed upon one side, and "p. m." trains upon the opposite side of the board, this improvement permitting the charting of a large number of trains in a minimum space. Instead of dividing the board in the centre vertically, and keeping trains in opposite directions upon the right and left of the line, they follow each other in sequence of time, their direction being indicated:

First, by the train numbers on the printed slip above; and second, by the color of the pegs.

The printed (or it may be written) slip at the top of the board is replaced with each change of schedule.

In reply to Mr. Appleton's query I beg to say that the pegs are not numbered to correspond with the number of the train they represent. Also that other trains are "pegged" upon the right-hand side of the board under the heading of "Extra Trains."

It must be borne in mind that the board illustrated was devised to fit a peculiar character of highly interwoven train movement, but the principle can be adapted to any character of traffic.

E. W. McKenna.

PITTSBURGH, Pa., March 8, 1886.

Standards of the Providence & Worcester Railroad.

VALLEY FALLS, R. I., Feb. 12, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send you herewith three drawings, representing standards used by this company, which I intended to have brought before the meeting for discussion, had not the time been taken up with other subjects.

It being announced that it would be brought before the Club at its next meeting, I will not go into explanation of any of the drawings. You will, on examination, no doubt see the points aimed at in the form of wheel tread shown in fig. 1. They show that all the wearing surface upon the rail is obtained at the start; and with the flange radius used, and the manner in which the brake-shoe is applied to the tread of the wheel, as shown in fig. 2 (not allowing it to wear on the tread or wearing part of the wheel, till it has worn to fit the cone), I find that flange wear is done away on this road, which is 43½ miles in length and has no one tangent over two miles long.

Some railroad men claim that a crooked road is the more favorable for the steel wheel; that there is less flange wear than on straight track. My honest opinion is that, if everything about the track is perfectly constructed, there will be but little trouble with worn flanges. I have been nine years accomplishing what I have toward the reduction of flange wear on engine and car wheels; and I am sure the company will receive—if it has not already received—great benefit from the use of this form of wheel tread, which, by the way, fits almost any shape of rail.

The distance gauge shown in fig. 3 is used to test wheels after being drawn on—in order to be sure, before they leave the shop, that they conform to the standard.

A. GRIGGS,
Supt. Locomotive and Car Depts.

An Old Locomotive.

An old locomotive, and the first ever run in California, originally built of the Norris Locomotive Works in Philadelphia in 1835 by Wm. Norris, for the old State road from Philadelphia to Columbia, is still doing service among the Sacramento shops of the Central Pacific Railroad. It was rebuilt at the Locomotive Works of Septimus E. Norris,

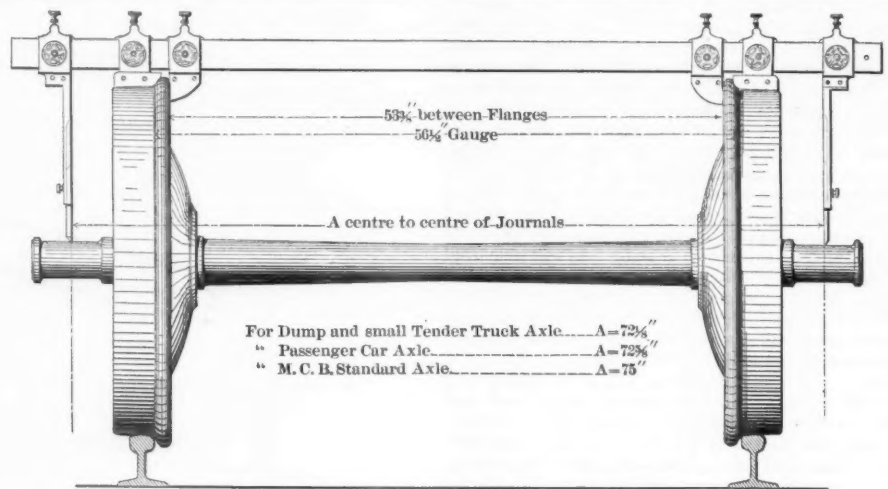


Fig. 3.

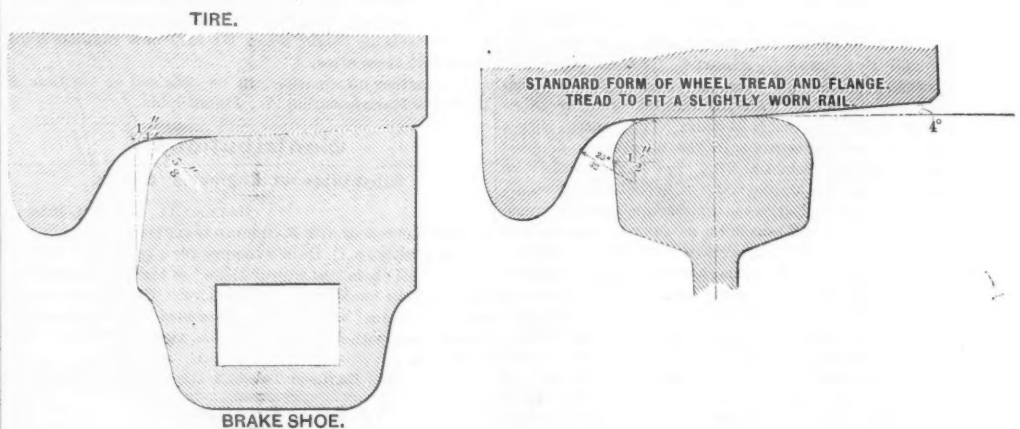


Fig. 2.

Fig. 1.

STANDARDS OF THE PROVIDENCE & WORCESTER RAILROAD.

Lancaster, Pa., in 1865, and a tank placed on top of the boiler. It was subsequently sold to the Western Pacific Railroad, and used for some time on the Market Street Railroad in San Francisco. It next went into the possession of the Central Pacific Railroad Co. and, as stated above, is still doing good service. It has given entire satisfaction, therefore, for over 50 years, and is still reliable for light purposes. It was named "Wm. Penn." had two 54 in. drivers, four 30 in. truck wheels, and weighed empty about nine tons gross; cylinders, 10½ by 18 in. The old locomotive is a portable monument, as it were, to the skill and workmanship of one of Philadelphia's oldest master-mechanics.—Exchange.

Foreign Railroad Notes.

The Nobel petroleum company, the great one of Russia, has ordered 500 tank cars to carry oil from the wells to the Black Sea.

The Russian government is said to have determined to purchase the railroad from Minsk to Brest, 212 miles, which will give it the larger part of the lines extending to the Polish border, whence it is concluded that strategic reasons have determined the purchase.

The management of the railroads in Alsace and Lorraine publishes the names of its employés who find money in the cars, stations, etc., and report it to be returned to the owners. It appears from this that last year there were 42 cases of such finding and reporting, the aggregate amount being \$2,669, and for most of this the owners were found.

The father of engineering is remembered almost on the spot where he made the first "tests," and called for a place on which to stand that he might move the world. In a list of Italian machine shops we find the "Stabilimento Archimede" at Messina, Sicily, not exactly on a scale to move the world, however, as a seven horse-power steam engine supplies it with motive power.

Russian papers say that a French company purpose to build a great union passenger and freight station for all the railroads entering St. Petersburg, and that to enable them to reach it an elevated railroad on an iron structure "of the American system," will be constructed. "The idea is a magnificent one," says a St. Petersburg paper, "but how it will take here is not yet known."

A German writer has published a pamphlet to show that the pooling arrangements of the German railroads ought to be reformed. All lines able to compete for a traffic, he says, have a valid claim for a share of the net earnings from that traffic, but the profits and not the traffic should be divided, and the whole of the business carried by that line which can carry it at least cost. Should it not be able to accommodate it all, then the line which next to it can carry at least cost should be given the excess. In this way the net earnings would be the largest possible. Something like this was suggested as desirable in the *Railroad Gazette* several years ago.

At the opening of 1886 the mileage of railroads belonging

to the German Railroad Union was 40,066. The additions of new road in 1885 were 790 miles, against 1,366 in 1884 and 944 in 1883. Of the additions in 1885 408 miles were in Germany, including, doubtless, all the new road except purely local lines which don't interchange traffic with other roads; 292 were in Austria-Hungary and 90 in Holland. Besides this 26 miles of old road in Austria came into the Union, and 8 miles went out. In Germany 12 miles more of narrow-gauge road were opened and will doubtless be admitted to the Union.

The Berlin City Railroad (elevated) has been in operation four years, crossing the city from east to west and being a thoroughfare for through and suburban trains as well as for purely city traffic. The purely city trains are 280 daily; the suburban 74, and the others 90, so that 444 trains are dispatched daily. It is a four-track road on a solid masonry viaduct. On summer Sundays 72 extra trains are sometimes run, and as many as 562 have been dispatched in one day. (There have been more than 800 regularly on a double-track line of the New York Elevated.) The number of passengers on the Berlin road was 8,896,460 the first year, and 14,256,490 in 1884-85. The four New York Elevated roads carried 103,354,720, and of these 48,399,496 were carried by the Third Avenue line, which is about 8½ miles long. From 400 to 500 employés are engaged on the Berlin road, and 64 locomotives are constantly in service.

Something like three years ago an Austrian government commission began to investigate certain complaints against the railroads. After many sessions and much hearing of testimony, the commission reported to the Ministry of Commerce its conclusions as to what the railroads ought to do. The Ministry referred them to the railroad companies, and these not long ago united in a memorial in which they say what of the commission's recommendations they can and what they cannot accept, and this memorial the Ministry has again referred to the railroads for further explanation of some points, saying that it would give a month for the answer, and then will itself seriously study into the merits of the case. Meanwhile, the Olmütz Chamber of Commerce wants to know if it is not time that the public should know what is going to be done about the commission's recommendations. Some people are always in a hurry.

In the long Mont Cenis Tunnel, near the Italian border of France, a freight train had reached about the middle of the tunnel when the trainmen began to be dizzy. When within four miles of the eastern entrance the helping engine at the tail of the train was to uncouple and run back to Modane; but the engineman and fireman were both unconscious, and the other trainmen were not much better off. Whether it was that the train was overheavy and so could not keep ahead of the smoke, or that the hydro-pneumatic ventilating machinery worked badly, does not appear. The engineman at the head of the train managed to keep on his feet till he had but one kilometre more to run in the tunnel, but then he became very ill, and was compelled to stop and whistle for help. Fortunately

at that moment a train from the other direction was met, and its men left it standing in the tunnel and ran the other one with its 14 asphyxiated trainmen to Bardonnèche. With due care and treatment the men finally recovered consciousness, and at last accounts were all out of danger.

The freight traffic over the Gotthard Railroad increased per cent. from 1883 to 1884, when it amounted to 324,705 tons. Food formed 28% per cent., iron and other hardware 21%, and fuel 21%. The average length of haul was 101 miles, and the average train load was 171 tons, against 143½ in 1883. The average rate per ton per mile was 2.38 cents, against 2.32 cents in 1883—a low rate for such a road.

The passenger traffic was injured by the prevalence of cholera in Italy in the fall. After it broke out, through cars to and from Italian cities were no longer run. The number of passengers carried fell from 207,055 to 165,694, or 20 per cent. The average passenger train load fell from 51 to 42%, and the average passenger fare from 2.52 to 2.361 cents per mile, being about the same as the freight rate, and much higher than the average of Continental railroads.

The gross earnings in 1884 were \$2,108,252, which is 9 per cent. less than in 1883. The decrease was wholly in passenger earnings, which fell off 25 per cent. More than four-fifths of this decrease was in the three months of July, August and September. The freight earnings increased 8.4 per cent.

The working expenses were \$970,989, and 7 per cent. less than in 1883: 19% per cent. of the expenses were for maintenance of road. The total working expenses were \$5,658 per mile of road and 97½ cents per train-mile. They were 50.14 per cent. of the transportation earnings.

The net earnings amounted to \$1,137,262, or \$6,892 per mile. This sufficed to meet fixed charges and pay a dividend of 2½ per cent. on the capital stock.

The Belgian State Railroad report for the year 1884 appeared in December, 1885, which is worse than our most dilatory companies do. The Belgian system is about equal to our systems of the third rank in extent, including at the close of 1884 1,731 miles of railroad. The cost of this had been \$133,682 per mile, of which no less than \$24,876 was for rolling stock—more than the total cost of some of our roads. The average reported cost of all our railroads, including rolling stock, is \$61,400 per mile; that of the British railroads is more than \$200,000. The average in Belgium has been reduced of late years by the addition of roads cheaper than the old ones. In 1875 it was \$153,993. One line nearly 200 miles long has cost \$180,000 per mile; it has grades of 84 ft per mile, and its chief traffic goes up the grade and is taken at the rate of 0.7 cent per ton per mile, which is thought to be ruinously low, but which is more than some of our railroads have been able to get on the average for all their freight.

Besides the 1,731 miles which it owns, Belgium works 202 miles of company roads for a percentage of their earnings, working 1,933 miles in all. The earnings and expenses of this system were:

	1884.	1883.	Inc. or Dec.	P. c.
Passenger.....	\$8,102,826	\$8,078,594	+	\$24,232 0.3
Freight.....	13,446,935	12,848,338	+	421,403 3.0
Express.....	1,708,154	1,689,955	+	18,199 1.1
Other.....	800,307	773,226	+	27,081 3.5
Total.....	\$24,038,222	\$24,390,113	—	\$351,891 1.5
Expenses:				
Road.....	3,451,420	3,541,661	—	90,241 2.5
Rolling stock.....	6,327,100	6,515,284	—	188,184 2.9
Transportation.....	3,886,487	3,882,068	—	4,419 0.1
Other.....	691,342	753,182	—	61,850 8.2
Total.....	\$14,356,339	\$14,692,195	—	\$335,856 2.3
Net earnings.....	9,681,883	9,697,918	—	16,035 0.2

The most notable thing in this to an American is the smallness of the changes. Rates are seldom changed in Belgium but business fluctuates, as in all iron manufacturing countries, and the proportion of the lower to the higher classes of freight should vary considerably. It will be noted that a little more than one-third of the earnings were from passengers. In 1884 the gross earnings were \$12,436, and the net earnings, \$5,009 per mile, and the working expenses, 59.72 per cent. of the earnings. The gross earnings per mile are about the same as the average of the railroads of our Middle States, but their net earnings were considerably less (\$4,230).

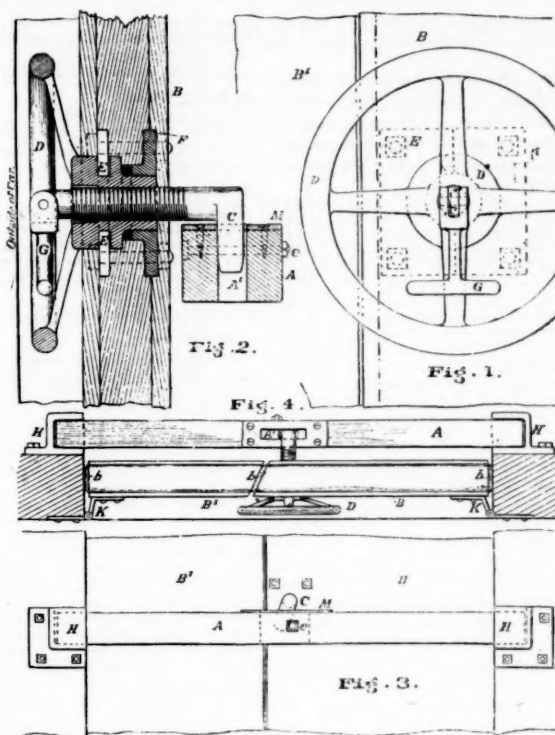
The net earnings of the Belgian system in 1884 were 3.68 per cent. on their cost to their government, while on most of its debt it pays as much as 4 per cent. It is probably able to borrow for 3½ per cent. now, however, and though it is desirable for a state, like an individual, to reduce its debt, there is no other reason why the state railroad system should make a profit for the government. Theoretically, net earnings should be kept down by reducing rates as traffic grows, improved methods of working are introduced, and debts extinguished by sinking funds; practically, however, it is very difficult to keep expenses from growing quite as fast as the earnings, rendering it impossible to make any considerable reduction in rates.

Cloud & Vogt's Refrigerator Car Door Fastener.

The accompanying illustrations represent a method of securing doors that has been recently patented by Mr. John W. Cloud and Mr. Axel S. Vogt, both of Altoona.

The invention is particularly applicable to doors of refrigerator cars, which should be capable of being easily closed so as to be air tight. The doors, by means of a screw actuated by a hand wheel, are made to press tightly against elastic packing interposed between the edges of the doors and the door framing.

The drawings show the invention as applied to a refrigerator car. Fig. 1 is a side view from outside, a portion of the outer sheathing of the door being cut away to show the plate E. Fig. 2 is a vertical section through the door fastener.



CLOUD & VOGT'S REFRIGERATOR CAR-DOOR FASTENER.

er. Fig. 3 is a side view of the door and fastener from inside, and fig. 4 is a plain view of the doors and fastening devices, showing the elastic packing.

A is a cross-bar adapted to be dropped into and held by sockets H H on the door posts.

B B' are the doors, which are made to lap over each other and over the frame at top and bottom. Wherever the doors come in contact with the frame or with each other (if more than one is used) they are padded with an elastic material or packing, as shown in b b b.

C is a rod passing through the door B, and having its inner end bent at right angles, or so as to engage with the bar A when turned in its direction. At its outer end the rod C is provided with a handle G, preferably hinged or pivoted to it, so that when not in use it may be bent down at right angles to the rod, as shown in figs. 1 and 2. By this construction the handle G will not extend beyond the outline of the car-sides, and additional outside sliding doors may be used if desired. The shaft of the rod C is threaded, as shown in fig. 2.

D is a wheel secured to the door B by means of the plates E and F, fig. 2, and the inside of the hub is threaded to receive the threaded rod C.

K K, fig. 4, are the hinges of the doors B B'.

M and e are a plate and bolt used to strengthen the cross-bar A, the bolt e also serving as a stop for the catch on the rod C.

The operation of this device is as follows: The cross-bar A is first placed across the doorway, resting in the sockets H H. The doors are then closed and the rod C rotated by means of its handle G, so that its bent end will pass down into the slot in the bar A. The wheel D is then revolved and the doors thus screwed up tightly against their frames and each other, the compression of the elastic packing making the joints airtight.

In opening the doors, the tight joints may be loosened by turning the wheel D in the other direction, which will not only loosen the pressure holding the doors together, but will, if continued, force the doors outward and away from their frames. When the doors are loose enough to pull open, the rod C is again turned by its handle, so that it will no longer engage with the cross-bar.

The cross-bar A may, if desired, be set vertically instead of horizontally, or a fixed post or brace may be used instead of a movable one, or one door may be secured instead of two, or a sliding door may be provided with elastic packing and made to fit hermetically in its frame by means of pressure applied by means of this device.

The lapping joints between the door and its frame, or between two doors, may be beveled, as shown, or rabbeted, if preferred.

The ordinary sliding door (not shown in our illustrations) is used on the outside to cover the air-tight door, and protect it from the weather.

Foreign Railroad Notes.

According to a late article in the German "Organ for Railroad Progress," iron boiler tubes are more economical than brass, taking into account the first cost and the cost of maintenance, as 3.96 is to 1. The advantage is specified as—

1st. Iron tubes resist longitudinal furrowing action better than brass.

2d. Iron tubes rupture less frequently.

3d. Iron lasts longer.

4th. The first cost of brass is three times that of iron, and its maintenance cost nearly four times as great.

The "Organ" mentions a new watch and clock dial arrangement, which appears to be the same recently exhibited at the

rooms of the American Society of Civil Engineers. This dial has a secondary dial which carries a series of 24 numbers arranged thus, 1, 14, 2, 15, 3, 16, 4, 17, 5, 18, 6, 19, 7, 20, 8, 21, 9, 22, 10, 23, 11, 24, around the outside. The outer dial has in place of figures 12 openings, through which, in one position of the under dial, the figures 1 to 12 appear, and in the other 13 to 24. By a simple attachment to the works, the lower dial is moved at noon, so as to show through the upper dial 13 to 24, and at midnight it moves back, so that the numbers now in use appear. It is said that the whole attachment, including dials and arrangement for moving the under one automatically by the action of watch or clock movement, is readily adjustable to any time-piece.

The German Railroad Union announces again the prizes which it awards every three years for important railroad inventions or contributions to railroad literature, amounting in all to 30,000 marks, or about \$7,290. For inventions or improvements in railroad construction or mechanical apparatus, a first prize of 7,500 marks, a second of 3,000, and a third of 1,500; equal prizes are offered for inventions or improvements in rolling stock, while for improvements relating to administration and railroad operation and railroad statistics, or for railroad publications of exceptional importance a first prize of 3,000 and two others of 1,500 each are offered.

The inventions or publications must make their appearance within the three years to July 15, 1887, and before that time must have been in use on some railroad of the Union.

The German "Organ" mentions three ways of using rail splice bolts which have approved themselves on German and Austrian roads by long use.

On the Vienna-Brunn line there have been used for 15 years bolts with a head but no nut, one side of the splice having the holes tapped with a screw thread, into which the bolt is screwed, with very satisfactory behavior as to remaining tight.

Another method is to so arrange the nut that it cannot turn the bolt, being screwed into it.

The first method will be recognized as having some obvious advantages, particularly where the rail section is such as to require the regulation of the height of the head, web, etc., more with a view to keeping the flanges clear of the splice and bolt-head than to wearing and carrying qualities.

It is very possible that better results may be obtained from making the nut fast than by our usual method of holding the head, since by so doing the whole bolt has to turn to get loose, and any pressure it may have against the slots in the rail web is brought into play for friction, besides the friction on the screw itself.

The third method seems to be a modification of one tolerably well known on our own roads, viz., the nut into which the bolt is screwed, as in the last method, is beveled on two sides, which fit into a correspondingly beveled groove in the splice. The nut is furthermore sawed partly through in such a way (the "Organ" says on two opposite sides, but one would imagine a cut across the top to be more effectual) as to cause the nut to be clamped by the combined screw and wedge action firmly against the bolt.

From the French "Reveu Générale des Chemins de Fer" we extract the following:

The stations of the Belt Railroad of Paris are stuccoed with lime mortar, the last coat being brushed on. This coat was made with particular care in order to get rid of the unburned lime, very small pieces of which would break out six months and a year after the building had been finished, giving it the appearance of having been the object of a fusillade. Somewhat fine sand was used, carefully screened to a uniform

size, and the coat was put on in four brushings in opposite directions, in order to obtain roughness through which the air could circulate freely.

The prices paid on the construction of this road, finished in May, 1883, are of interest, as showing that prices in France do not vary, on an average, greatly from our own, except in special items like ties, in spite of much lower wages, showing the greater effectiveness of the high-priced labor.

The average prices were as follows:

Grading per cubic yard.....	\$0.26 3
Ballast, per cubic yard.....	0.46 3
Cut stone masonry, walls and buildings per cubic yard.....	11.84
Rubble masonry walls, per cubic yard.....	3.20
Rubble masonry buildings, per cubic yard.....	3.77
Brick masonry, per cubic yard.....	7.40
Steel rails, per pound.....	0.02 3
Girder iron, per pound.....	0.03 4
Wrought iron in buildings (dwellings), per pound.....	0.03 0
Wrought iron in buildings (freight houses), per pound.....	0.04 5
Oak ties (probably preserved), per piece.....	1.34
Single switches, per switch complete.....	92.71
Triple switches, per switch complete.....	142.19
Frogs, 3° 30' (probably complete with guard rails, spikes and ties).....	77.02
Frogs, 7° 30'.....	77.22
Frog crossing, 7° 30'.....	140.06

The iron used showed, under test, moduli of rupture from 46,286 lbs. per square inch with 8 per cent. elongation, up to 51,400 lbs. with 12 per cent. elongation.

Several of our English exchanges say that the London & Northwestern Railway has definitely adopted steel ties throughout its system. This line, possessing steel works, manufactures ties and rails, and thus saves a manufacturer's profit, and possibly this point may have had some weight in determining the adoption of steel. This decision takes the question out of the region of experiment into that of everyday practice, and will no doubt have an important influence on roads elsewhere. It is almost universally assumed that the expense for ties is much greater in England than in this country. While timber is cheaper here, it lasts longer in England, and fewer ties are used per mile there, so that the cost per mile per year is greater here than there. Taking an average American road with 2,640 ties per mile, at 50 cents each, lasting 7½ years, against an English road with 1,760 ties at 80 cents each (treated), lasting 13 years, it will be found that the American ties cost \$1,320 per mile against \$1,408, the first cost on the mile of English road. The annual renewals will, however, be \$1,320 ÷ 7.5 = \$176 against \$1,408 ÷ 13 = \$108. At these prices, and with this length of life, ties for a mile of road for 15 years in this country would cost (at 4 per cent. interest) \$4,148, and in England only \$2,708, making the cost decidedly smaller in England.

The steel ties for the Midland Railway, illustrated in the *Railroad Gazette* of Jan. 8, are reported to have cost \$1.76 each, weighing 137 lbs. and costing 1.3 cents per pound. Ties of so light a pattern are now generally condemned in Germany. An iron tie costing \$1.76 in track must last about 50 years, with interest at 4 per cent., to be as economical as a wood tie costing 80 cents and lasting 13 years, with interest at 4 per cent., for which nearly all English companies can get money. With a higher rate of interest, the life of the metal would need to be longer.

The present tendency in England seems to be to use a steel tie that weighs slightly more and costs twice as much as a wooden tie. The steel tie, however, gives more bearing surface on the ballast and perhaps is expected to make a better road, requiring less labor to keep in good order, though German experience does not indicate this. The use of such ties has been experimental in England; in Germany it has existed on a large scale for some 10 years.

THE SCRAP HEAP.

Backing Down Gracefully.

A German naturalist went to Arizona, and one day came across a horned rattlesnake sunning himself on the edge of a prairie dog's burrow. The naturalist had no stick, but was frantically eager to secure the snake, which was retreating down the hole. So he pulled him out by the tail, and then sprang back to avoid unpleasant consequences. The snake again started down, and again was dragged out by the tail. This time the snake cocked one eye at the naturalist, worked his under jaw in a significant manner, and went down tail first. The naturalist went home.—*Scientific American*.

The bearings of this observation are in its application.

How to Do it.

A correspondent writing from the South says he hears that in New York some sharp individuals have built a \$160,000 road for \$3,000,000. He says down their way they wish to build a \$3,000,000 road for \$160,000, and wants to know how it can be done. Some one from New Jersey has suggested: "Don't drink milk and never draw checks," but this doesn't seem enough to grade the road or lay the rails.

The Bee Line.

The *Bee Line Gazette*, which is published by the Passenger Department of the Cleveland, Columbus, Cincinnati & Indianapolis road, says in its last issue: "We have often been asked how it was the sobriquet 'Bee Line' became applied to this system? Nearly everybody takes it for granted it is on account of being the shortest route between Cleveland and its various important termini; and while this alone is good and sufficient reason for its adoption, yet it originated in an entirely different way. Back in the sixties, the Bellefontaine Railroad was in operation between Galion and Indianapolis, and while 'wars and rumors of wars' were keeping the loyal people along its line of railway in a state of constant agitation, the head of its passenger department, being a military officer, conceived the bold idea of carrying the fight into their very midst—of long words. Summoning all of his forces together, which, from official report, numbered but one Falcon pen and holder charged with Arnold's writing fluid, he moved against Bellefontaine, and after a sharp, pointed affray, reduced the enemy's forces to Bee—e l—ine. This ended the campaign—a campaign in which the pen was mightier than the sword, and, unlike Mark Twain's—one which did not fail. The Bellefontaine Railroad was long since merged into the Bee Line system, radical changes have occurred in officers and the policy of management, but the sobriquet 'Bee Line' has withstood time and its changes; has carried its folders and *Gazettes* into all parts of our great and glorious

country, even beyond the seas, and, to-day, as a sobriquet, is more favorably and popularly known than that applied to any other railroad. This is actually its derivation, each letter being taken from the single word Bellefontaine."

A Long Title.

The census in Bavaria has brought to light the following terse, though somewhat lengthy title: "A—B—, Royal Bavarian Railroad Constructionsectionfirewoodstorehousekeeper."

Railroad Young Men's Christian Association.

The association at Detroit is reported by its organ, the *Headlight*, to be in prosperous condition, with an active membership and energetic officers. The reading-rooms are well supplied with papers and are largely attended. Three lectures and three other entertainments are announced for the month of March.

The Massachusetts Commission on the Woburn Accident.

The Massachusetts Railroad Commissioners have just rendered their decision on the collision between the outward-bound Lawrence train and the inward bound Montreal express, that occurred at the North Woburn Junction on the Boston & Lowell road, on the evening of Feb. 12. In this they place the responsibility chiefly upon the engineer of the Lawrence train, charging him with neglect for disregarding the distance signal connected with the system of interlocking signals and switches in use at this point. They deny the correctness of the engineer's statement regarding the indications shown by the signals, and explain that both by the mechanical arrangement of the system and the position of the Montreal train after the collision, the signal could not possibly have been as he claimed. In fact, they say that, by his own admission, immediately after the accident, he made a mistake. The system of signals and switches in use at this junction are commended, and the fact that if trainmen obey the signals a collision is impossible is noted. The absence of a "throw-off," by which the train of an engineer who runs against the signals would be side-tracked or thrown off before a collision could occur, is commented upon and criticised. A recommendation is made that at this, and at like junctions, prompt action be taken to avoid the possibility of collisions by using ground switches. The fireman, who, according to testimony, appears to have seen the green distance signal, seems, the commissioners continue, to have been remiss in not calling the engineer's attention to the fact that the distance signal indicated "caution."

"It is doubtful," they say in conclusion, "whether the engineer who had been employed in switching, and who was running over this route on his third trip, fairly comprehended the meaning of a green signal. This is the more probable because green is regarded as the opposite of red, and is used on switch targets on this and other roads to indicate safety. The position which the engineer now assumes in his defense prevents us from learning positively whether this was or was not the case. But no one can doubt the importance of thoroughly instructing the men in charge of a train as to the meaning of signals, and of catechising them so as to be sure that they understand them. No blame attaches to those in charge of the Montreal express train. They obeyed the signal and did all that was possible to avoid the disaster."

TECHNICAL.

Locomotive Building.

The Canadian Locomotive Works in Kingston, Ont., last week turned out a new locomotive for the Erie & Huron road.

The New York Locomotive Works in Rome, N. Y., have recently received several orders and have increased their working force.

The Illinois Central shops at McComb City are building 2 shifting engines for the use of the road.

The Dickson Manufacturing Co. in Scranton, Pa., is building 6 mogul freight engines for the New York, Ontario & Western road. They will burn anthracite coal.

The Car Shops.

The Missouri Car & Foundry Co. in St. Louis have a number of orders on hand and are running full time.

The Peninsular Car Works in Detroit are building 400 box cars 34 ft. long for the Cincinnati, Hamilton & Dayton road.

The Old Colony Railroad Co. has recently let contracts for building 27 new passenger cars for summer business.

The Illinois Central shops in McComb City, Miss., are building 75 coal cars to carry 20 tons each.

Car Couplers.

The Hien car coupler is to be put on the freight cars of the Northern Pacific road. That company has ordered 1,000 of these couplers, and will place them on its cars as quickly as possible.

In Boston, Jan. 3, there was a hearing before the Committee on Railroads of the Massachusetts Legislature on the application of certain parties interested in car couplers, who asked for legislation providing that railroad companies be allowed to adopt any coupler they wish, provided only that it did not require brakemen to go between the cars to couple or uncouple. The applicants presented their arguments, and Judge Russell, Chairman of the Railroad Commission, appeared in opposition. A number of the railroad companies were represented by counsel, but took no part in the hearing.

Bridge Notes.

The contract for the highway bridge on Pinnacle avenue, Rochester, N. Y., has been awarded to the King Iron Bridge and Manufacturing Co. in Cleveland, O. There were four bidders altogether.

The Morse Bridge Works in Youngstown, O., are running full time and have received several additional orders.

Iron and Steel.

Keystone Furnace at Reading, Pa., which went out of blast a short time ago, was blown in again last week.

From Pittsburgh, manufacturers report a largely increasing number of orders for rolling mill machinery, indicating a considerable improvement in the trade.

The stockholders of the Roane Iron Co. in Chattanooga, Tenn., have resolved to establish steel works, provided the present experiment with their ores proves successful.

The Pennsylvania Steel Co., at Steelton, Pa., last week put its fifth furnace into blast.

The blast furnace at Frankstown, Blair County, Pa., which is owned by the Cambria Iron Co., and which has been out of blast for 3 years, has been leased to Mr. James Pierpont, and will be started up as soon as necessary repairs can be made.

The Hartman Steel Works, in Beaver Falls, Pa., recently rolled a steel bloom weighing 735 lbs. into a shaft 4 in. in diameter and 20 ft. long. This is the largest bloom ever rolled at these works.

The Rail Market.

Steel Rails.—The market is quiet and quotations continue steady at \$34.50@35 per ton at mill, with \$34 named as an inside price for heavy lots.

Rail Fastenings.—Prices continue unchanged at 2.40 cents

per lb. for spikes in Pittsburgh; 2.75@3.10 for track-bolts and 1.70@1.80 for splice-bars, with an improved demand reported.

Old Rails.—The market for old iron rails is unsettled, with a much lighter demand reported. Quotations are \$21@22 per ton at tidewater. Old steel rails are quoted at \$22.50@24 per ton in Pittsburgh, according to length.

The Westinghouse Electric Co.

The Westinghouse Electric Co., of Pittsburgh, with \$1,000,000 capital, has applied at the state department of Pennsylvania for a charter. Its incorporators are George Westinghouse, Jr., W. H. Jackson, H. H. Westinghouse, John Dalzell, John R. McGinley, John Caldwell, Robert Pitcairn, all of Pittsburgh, and Frank L. Pope, of Elizabeth, N. J. Eighteen thousand shares of the capital, at \$50 per share, subscribed for by George Westinghouse, Jr., are paid in full, and are to be issued to him as full paid capital stock, in consideration of the conveyance by him to the corporation of certain letters patent securing inventions relating to electricity, of the services of William Stanley, Jr., for two years from Jan. 1, 1886, in experimenting in the field of electrical engineering with all the inventions made therein, and of certain contracts with Fairbanks, Morse & Co., of Chicago, and with Westinghouse, Church, Kerr & Co., of New York, for the sale of appliances to be made by this company. Attached to the application is a list of the patents conveyed to the corporation by Westinghouse. They are all inventions of Stanley, and include the electric lamp, air pumps, secondary battery, thermal cut-outs apparatus for charging and discharging secondary batteries, armature for dynamo-electric machines, filament for incandescent lamps, induction coil, multiple incandescent electric lamps, carbon for incandescent lamps, socket for incandescent lamps, electric regulator and holder for incandescent lamps. There are also pending before the Commissioner of Patents, to be part of the plant, applications for patents for a system of electric lighting, armature for dynamo-electric machines, mercury pumps, induction coil, electric alarm indicator, attachment for dynamo-electric switch or circuit controller, and others of minor importance. The company will manufacture machinery and appliances for the generation, transmission and utilization of electricity. Operations will be commenced at once.—*Electrician and Electrical Engineer*.

Blue and Black Prints.

A correspondent from California asks for some information as to the proper manner of preparing blue print paper commercially. He states that the paper purchased keeps indefinitely and gives pure white lines, but that he cannot obtain these results with home-made paper. In reply to a query on this point, Mr. S. H. Harrington, Mechanical Engineer of the Pittsburgh, Cincinnati & St. Louis, writes:

"I inclose herewith our receipt for making blue prints and black line prints. We use helios paper, and sensitize the paper as we need it; we never keep prepared paper on hand or use chemicals that have been mixed over two weeks. Fresh mixed chemicals and fresh prepared paper are essential for good blue prints. We have tried sponge-brush and floating in applying chemicals to the paper, but find the former to give best results. Chemicals and paper should be prepared in a dark room and paper kept from the light, and opaque baths used for chemicals."

FERRO-PRUSSIAN PROCESS.

White Lines on Blue Paper.

Citrate iron and ammonium.....	2½ oz.
To water.....	12 "
Red prussiate potash.....	1¼ "
To water.....	12 "
Gum Arabic.....	¼ "
To water.....	2 "

Disolve separately, and mix together in an opaque vessel. Expose 5 to 8 minutes.

Develop by washing in clean water.

GALLATE PROCESS.

Black Lines on White Paper.

Sesquichloride of iron.....	130 grs.
Sulphate of iron.....	48 "
T-tartaric acid.....	48 "
Gum Arabic.....	¼ oz.
Water.....	18 drs.

Dissolve together, expose 15 to 20 minutes.

DEVELOPING BATH.

Gallie acid.....	25 grs.
To water.....	10 oz.

Wash thoroughly in clean water.

Mr. Harrington has been very successful in duplicating processes, producing exceptionally fine blue and black prints, and we trust that his receipts will be of use to many of our readers.

Engineers' Club of St. Louis.

A regular meeting was held in St. Louis, Feb. 18, President McMath in the chair; 22 members and 2 visitors present.

The Executive Committee reported the adoption of the following rule: "Members in arrears whose journal has been stopped, will be notified of the same within 30 days, and informed that they are liable to be reported to the Club and published in the proceedings as delinquent."

The Club decided to tender Col. Henry Flad a complimentary lunch in honor of his election as President of the American Society of Civil Engineers. Messrs. Holman, R. Moore and Ockerson were appointed as a committee to make arrangements.

Mr. S. Burt Russell read a paper on "The Efficiency of a Pipe System for Furnishing Water to Fire Engines." The problem was, as he stated it, to furnish any point in the city a sufficient quantity of water to supply a maximum number of fire engines at the least cost consistent with assured safety. The necessity of some means of testing the efficiency of a system. Description of a proposed simple, cheap and reliable method of testing the efficiency with tables of experiments and formulas used in obtaining and verifying the same. Advantages of this method as compared with the use of formulas alone with the usual incomplete data. The difference between a system of pipes for fire protection, and a system for domestic purposes only. Fire protection, wherever portable engines are used, compared with fire protection, using the direct pressure from the main. The amount of water to be provided for, for fire protection, in different sections of the city. Points to be observed in designing a system of pipes for fire protection.

The paper was generally discussed, after which a general discussion followed and the club adjourned.

Engineers' Club of Philadelphia.

A business meeting was held in Philadelphia, Feb. 20, President Washington Jones in the chair; 38 members and 2 visitors present.

The tellers of election reported the following gentlemen elected active members of the Club: George R. Henderson, R. C. Luther, Llewellyn W. Jones, Samuel T. Wagner, Frederick H. Lewis, Carl O. Lindroth, Phillips Bassett, Frederick H. Robinson, Philip D. Borden, Jr., W. L. Hoyt. Mr. J. Foster Crowell presented an elaborate paper on the

RAILROAD EARNINGS IN JANUARY.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1886.	1885.	Inc.	Dec.	P. c.	1886.	1885.	Inc.	Dec.	P. c.	1886.	1885.	Inc.	Dec.	P. c.
EASTERN ROADS.															
Balt. & Potomac	92	92				\$ 101,091	\$ 98,472	2,619			\$ 1,099	\$ 1,071	28		2.6
B. H. T. & W.	87	87				38,356	32,222	6,134			441	370	71		19.2
Buff. N. Y. & P.	663	663				169,813	154,381	15,432			256	232	24		10.1
Buff. Ro. & Pitts	294	294				105,914	88,484	17,430			360	301	59		19.7
Danbury & Nor	37	37				15,249	14,100	1,089			412	383	29		7.8
Grand Trunk	2,994	2,977	21		0.7	1,011,637	1,113,021	2,597			337	374	37		9.9
Long Island	354	354				153,033	150,416	2,597			432	425	7		1.7
N. Y. City & No.	54	54				37,312	28,828	8,484			691	534	157		29.3
N. Y. L. E. & W.	1,075	1,075				1,254,112	1,050,474	203,638			1,167	977	190		19.4
N. Y. & N. Eng.	392	392				268,965	230,420	37,845			684	588	96		16.4
N. Y. Ont. & W.	321	321				82,856	83,353				258	260			0.5
N. Y. Sus. & W.	150	150				81,650	70,665	10,985			544	471	73		15.5
Northern Cen.	323	323				400,123	404,216				1,239	1,251			1.0
Penns. Railroad	2,315	2,308	47		2.1	3,421,536	3,277,522	144,014			1,478	1,445	33		2.3
Phila. & Reading	1,560	1,560				2,055,583	1,846,366	209,217			1,318	1,184	134		11.3
R. W. & Ogd'g	418	418				124,577	114,937	9,640			298	275	23		8.4
West Jersey	200	200				68,493	70,119				342	350			2.3
Total, 17 roads	11,343	11,265	68			9,389,700	8,828,576	669,224			829	784	45		5.7
Total inc. or dec.			68		0.6			561,124					45		5.7

SOUTHERN ROADS.															
Ala. Great So.	290	290				\$ 94,152	\$ 104,791				\$ 325	\$ 362			10.9
Cin. N. O. & T. P.	336	336				199,865	201,647				595	600			0.9
East T. V. & Ga.	1,100	1,100				324,032	427,885				295	389			31.2
Ill. Cen. So. Div.	711	711				312,984	407,350				440	573			30.2
Louis. & Nash.	2,035	2,065				1,050,021	1,170,749				524	567			8.1
L. N. O. & Tex.	543	543				156,031	167,503				288	214			74
Mobile & Ohio	527	527				188,802	201,681				317	383			21.2
N. Chat. & St. L.	580	580				185,519	184,086				320	319			0.3
N. O. & North'n	195	196				62,702	57,861				322	297			25
Norfolk & West.	512	512				218,907	229,254				428	448			4.5
Rich. & Danville	757	757				276,800	325,100				366	429			17.3
Rich. Col. & A.	377	377				60,491	77,940				160	207			29.3
Col. & Greenb.	296	296				53,984	71,706				182	242			33.5
Pa. Pacific	317	310				60,002	60,180				192	194			1.1
Va. Midland	352	352				84,606	98,582				240	280			16.7
West. N. Caro.	286	274				34,189	33,865				120	124			3.2
Vicks. & Merid'n	142	142				47,245	42,281				333	298			11.8
Total, 17 roads	9,326	9,279	97		50	3,389,235	3,793,361	69,912			363	409			12.7
Total inc. or dec.			97		0.5			474,038					46		11.2

CENTRAL GROUP.															
Chi. & East. Ill.	252	252				\$ 132,336	\$ 127,034	5,302			\$ 525	\$ 504	21		4.2
Chi. & W. Mich.	413	413				83,834	74,928	8,906			201	181	22		11.9
C. I. St. L. & C.	342	342				193,994	201,443				573	585			2.1
C. Wash. & Balt.	281	281				144,522	154,784				514	551			37
Clev. Ak. & Col.	144	144				32,638	31,791	847			227	221			3.7
Col. H. V. & T.	324	324				170,371	168,838	1,533			526	515			2.1
Det. Lan. & No.	261	261				65,770	73,949				252	283			31
Ev. & T. Haute	146	146				51,177	54,423				351	352			0.3
Flint & Pere M.	362	362				152,070	143,850	8,220			420	397			5.7
Ill. Cen. Ill. lines	953	953				452,716	508,607				475	534			12.5
Ind. Bl. & West.	532	532				178,763	169,771	8,992			336	319			5.3
Ind. Dec. & Sp.	152	152				35,999	30,487	5,512			237	201			18.0
N. Y. Penn. & O.	587	587				408,076	389,661	18,415			695	664			4.7
Ohio & Mississip.	616	616				274,180	300,300				446	488			42
Ohio Southern	130	130				44,790	45,109				345	347			0.7
Peor. Dec. & Ev.	254	254				53,963	61,275				213	241			28
St. L. Al. & T.H.	195	195				89,256	97,267				458	496			8.3
Main line	138	138				59,340	58,662	778			428	429			0.2
Belleville line	2,361	2,361				814,246	1,053,319				345	446			101
Wab., St. L. & P.	1,381	1,381				59,340	58,662	778			428	429			0.2
Total, 19 roads	8,442	8,442				3,439,741	3,742,098	60,505			407	443			36
Total inc. or d.								302,357					36		8.1

NORTHWESTERN ROADS.															
Bur. Ced R. & No.	960	960				\$ 177,563	\$ 223,719				\$ 179	\$ 226			26.8
Central Iowa	500	500				80,429	85,646				161	171			6.2
Chi. & Alton	850	850				557,241	646,835				655	761			106
Chi. Bur. & Q.	3,647	3,647				1,386,721	1,992,484				380	575			195
Chi. Mil. & St. P.	4,953	4,904				1,445,000	1,517,397				292	316			24
Chi. & Northw.	3,930	3,800				1,315,200	1,512,630				341	398			57
C. St. P. M. & O.	1,330	1,313				326,609	381,452				246	252			2.4
Des M. & Ft. D.	138	138				19,394	25,311				142	183			42
Ill. Cen. Ia. lines	402	402				88,300	103,603				220	258			17.5
Mar. H. & O.	160	138				21,519	15,671	5,848			33.6	134			114
Mil. L. S. & W.	533	491				94,615	72,605	22,010			30.4	178			148
Mil. & Northern	227	227				38,680	30,070				390	170			172
Wiscon-in Cen.	440	440				92,728	101,659				8,931	8			211
Total, 13 roads	18,090	17,560				5,663,990	6,668,032	27,858			313	380			67
Total inc. or dec.								1,031,900					67		17.7

ROADS NORTHWEST OF ST. PAUL.															
Canadian Pac.	3,527	2,794				\$ 497,000	\$ 423,764	73,236			\$ 141	\$ 152			7.3
Northern Pac.	2,741	2,453				480,330	553,582				175	226			51
St. P. & Duluth	225	225				64,847	81,380				288	362			74
St. P. Minn. & M.	1,485	1,471				409,176	462,125				276	314			38
Total, 4 roads	7,978	6,943				1,451,353	1,520,851	73,236			182	219			37
Total inc. or dec.								142,734					37		16.9

SOUTHWESTERN ROADS.															
Fort W. & Den.	144	110				\$ 24,650	\$ 22,718	1,932			\$ 171	\$ 206			17.0
G. C. & S. Fe.	580	536				152,193	92,297	59,896			65.2	258			50.0
K. C. Fe. S. & G.	389	349				183,402	220,610				471	567			96
K. C. S. & Mem.	282	282				88,745	150,054				315	532			217
St. L. & San F.	815	694				282,697	315,923				347	393			46
Tex. & St. Louis	735	735				103,395	63,890	39,496			61.7	141			87
V. Shreve. & Pa.	170	170				42,207	30,539	11,668			38.2	249			180
Total, 7 roads	3,125	3,026				877,199	896,050	112,992			281	296			15
Total inc. or dec.								131,843					15		5.1

FAR WESTERN AND PACIFIC ROADS.															
Den. & Rio G....	1,317	1,317	.....	.....	.....	404,424	405,341	.....	917	0.2	307	306	.....	1	0
Den. & Rio G.W.	368	368	.....	.....	.....	66,970	67,041	.....	71	0.1	182	182	.....	.....	.....
St. J. & G. Is'd.	252	252	.....	.....	.....	52,742	86,766	.....	34,024	39.1	209	344	.....	135	39
..... & Pacific....	1,487	1,487	.....	.....	.....	429,000	342,000	87,000	.....	25.4	288	230	58	.....	25
Union Pacific....	4,519	4,476	43	.....	.....	1,428,029	1,674,948	.....	246,919	14.7	316	374	.....	58	15
Total, 5 roads.....	7,943	7,900	43	.....	.....	2,381,165	2,576,006	87,000	281,931	.....	300	326	.....	26	.....
Total inc. or dec.	.....	.....	43	0.5	.....	.....	.....	.....	194,931	7.6	.....	.....	.....	26	8
GRAND TOTAL :	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 82 roads.....	66,237	64,415	1,872	50	.....	26,592,383	28,025,004	1,100,727	2,286,489	.....	401	435	.....	34	.....
Total inc. or dec.	.....	.....	1,722	.....	2.8	.....	.....	.....	1,432,681	5.1	.....	.....	.....	34	7



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE SOUTHWESTERN STRIKE.

The strike which for several days has prevented the movement of any freight trains on the Texas & Pacific and on the great system worked by the Missouri Pacific is one of the most serious disturbances we have ever had to chronicle. It did not appear for several days what the occasion of it was, and doubtless the larger part of those engaged in it were entirely ignorant of the cause; but it now appears that the grievance is not in any way connected with wages or hours of labor, but that certain employes of the Texas & Pacific had been discharged because, as the leaders of the strikers say, they had been active in an organization of the employes, but as the Receiver says, because they were incompetent or negligent. The strike on the Missouri Pacific and the St. Louis Bridge was apparently because these are "Gould" properties, as the Texas & Pacific is, though it is now being worked for the benefit of its creditors, who will be the sufferers from its losses.

The whole matter is closely connected with a strike on this Southwestern system just about a year ago, in which the strikers seem to have had the sympathy of the public, though, whatever the grievances which occasioned it, it was accompanied by many acts which should have been punished by imprisonment, strikers violently taking possession of the company's property, violently driving away men desiring to work, and forcing some of the subordinate officers to do their will at the muzzle of the revolver. Rarely has there been a more shameful surrender of government to violators of the law than there was in this case, for we believe no attempt was made to arrest any one. The local feeling against the Texas & Pacific seemed very bitter, and it may have deserved it; and it may have been entirely proper for the men to get what they were striking for; but that the criminal deeds of the strikers should have gone unpunished was a very grave mistake, naturally resulting in a repetition of the practice, such as there has been this year several times in Texas and Louisiana, and was last week in New York, when the striking street-car men not only left their work, as they had a perfect right to do, but overturned cars and otherwise obstructed the tracks, for doing which any one else would be put in jail *instantly*.

When the officers of the Texas & Pacific finally settled the troubles with their men, they not only gave them what they required as to wages and hours, but agreed to do certain things concerning the discharge of employes, which virtually deprived them of the authority absolutely necessary to enable the officers of a railroad to be responsible for its operation, and it is probably because of some real or supposed violation of this part of the agreement that these men have struck now. Nothing could excuse the officers of the company for making such an agreement except the knowledge that the property in their charge had been taken possession of violently and the conviction that the lawful authorities could not or would not restore it to its owners. It was proper to agree not to discharge any one simply for striking or for belonging to the

Knights of Labor or any other workmen's organization; it is almost always foolish to discharge for such a reason; but to make such an agreement concerning a man who disabled locomotives, tore up rails, or thrust a pistol in a foreman's face, or even as to an intemperate, an incompetent or a negligent man in a place of responsibility, is a serious offense against the community, not to say the owners of the railroad. It was almost sure to result in a renewal of difficulties.

It so happens, however, that the company has no chance to keep or violate its agreement, for it is no longer the employer of the men, as it failed to pay its creditors, and the United States court has taken possession of the railroad and is working it through a Receiver, who of course is not bound by any such agreement.

It does not appear that violence has been used to stop the running of trains, for we do not learn that any attempt has been made to run any freight trains (this is written Wednesday), which of itself seems to be a serious negligence on the part of the railroads, if it is in any way possible to secure the necessary men; but some things have been done which, it would seem, should be unlawful, if they are not, and which probably are.

In the first place, the combined action of men in stopping traffic on the Missouri Pacific lines without notice and without any complaint whatever against that company, in order to cause something to be done on another railroad, seems very like a conspiracy. Again, the refusal, before the strike began on the Missouri Pacific, to permit any cars coming from or going to the Texas & Pacific to be hauled in Missouri Pacific trains, or should be, an offense against the laws and punishable as such. If this is permissible, the fulfillment of almost any contract can be prevented by any employe of the contracting party. It is as if a railroad should refuse to carry any freight consigned to Knights of Labor, or to carry the men themselves, unless they should agree to work for or not to work for some other railroad.

Organizations of workmen make a great mistake in following such courses. The numerous cases within a year past when striking workmen have violently taken possession of the property of their employers in order to keep other men from working on it, and the very general neglect of the authorities to punish such offenses, and frequently the indifference or even the sympathy of the public, have led many workmen, no doubt, to look upon this and other illegal measures as natural and proper; and not a few seem ready to do anything which seems likely to secure their end. This will go on, we may be sure, so long as these illegal or criminal acts remain unpunished and are followed by success. They have been neglected so long that already they seriously threaten the order and welfare of society; a community in which a large body of men are ready to destroy one man's property because another man has offended them is little better off than a community of savages. A civilized community will not long endure such a condition of things, and when it is once aroused, which will be when it has suffered severely, it is likely to put a very sudden end to it; and then it may be long before workmen and their organizations will get the public sympathy and support which they deserve, and which help them immensely in securing the rights and privileges which are properly their due.

THE ILLINOIS CENTRAL.

The report of the Illinois Central Railroad Company for 1885, an abstract of which we published last week, shows an increase over 1884 of 8 per cent. in freight traffic and of $4\frac{1}{2}$ per cent. in passenger traffic, more than three-fifths of the latter being in the suburban passenger traffic over about ten miles of the road out of Chicago, these few miles of road having nearly one-fifth of the passenger traffic of the whole system of 2,066 miles (but yielding only one-eleventh of the total passenger earnings). The increase of 8 per cent. in the freight traffic was carried with an increase of 12 per cent. in freight-train mileage, there being a decrease from 127 to 123 $\frac{1}{2}$ tons in the average freight train load, and for the increase of $4\frac{1}{2}$ per cent. in passenger traffic there was an increase of 14 per cent. in passenger-train mileage, the average train-load falling from 39 to 35 $\frac{1}{2}$. This is based on the "engine mileage" engaged in hauling the two kinds of trains, which may be more than the train mileage proper, though a very large switching mileage is reported separately, and the reported earnings per train-mile agree with it. In the whole engine mileage there was an increase of 11 per cent. to carry an increase of a little less than 7 per cent. in the total traffic.

The train loads are small, but the expense per train-mile is less than on most roads, amounting to but 76 cents last year, against 79 $\frac{1}{2}$ the year before, a reduc-

tion of $4\frac{1}{2}$ per cent. At this rate, counting the cost the same for both kinds of trains (which is less erroneous than it would be on most roads), the cost last year was 0.62 cent per ton per mile and 2.19 cents per passenger-mile.

The increase of 8 per cent. in freight traffic was accompanied by an increase of but 3.1 per cent. in freight earnings, and the increase of $4\frac{1}{2}$ per cent. in passenger traffic by an increase of 3.7 per cent. in passenger earnings, there being a reduction from 1.37 cents to 1.31 cents in the average receipt per ton per mile, but only a very minute one in the receipt per passenger per mile, and this wholly due to large growth of suburban travel, for the average fare of the other passengers increased from 2.374 cents per mile to 2.400 cents.

The report for the first time gives the earnings from each source and the expenses under the different heads for each month of the year, and also the monthly earnings on each line—as the Springfield Division and the two branches of the road in Mississippi. It appears from this that the Springfield Division, which lies through a fine part of Illinois, and gives this road a line between Chicago and the capital of the state, earned gross only \$2,326 per mile last year—small for a Southern or border railroad—and the Middle Division, which is formed of three branches amounting to 131 $\frac{1}{2}$ miles in the very garden of Illinois, earned \$2,205 per mile, against \$7,518 on the old Illinois Central, from Chicago and Dubuque to Cairo. The branches in Mississippi have done nearly as well as those in Illinois, the Aberdeen Division earning \$1,895, and the Yazoo Division \$2,134 per mile, while the main line from Cairo to New Orleans earned \$7,516 per mile, or very nearly the same as old Illinois Central in Illinois, of which, doubtless, the line from Centralia to Dubuque has comparatively light earnings, and that from Chicago to Cairo heavy ones. Judging from the gross earnings, the Springfield Division earns little more than its fixed charges; the Middle Division costs so little that it may return a profit, and more recent additions, built with capital on which but 4 per cent. interest is paid, may earn very little and yet pay very well.

The recent disposal of 3 $\frac{1}{2}$ per cent. bonds at par by this company has attracted some attention, but not nearly as much as it deserves. It has significance of two kinds, one general, as indicating the reduction in the current rate of interest, and the other special, as showing what great advantage a company with light fixed charges has. For it is not every company that can borrow at 3 $\frac{1}{2}$ per cent. now; it is only the strongest that can place 4 per cent. bonds at par, and most have to pay more than that on first-mortgage bonds. The companies get money cheap which offer unquestionable security, and such security is afforded only when the net earnings very largely exceed all the fixed charges for which the mortgaged property is liable. Now the Illinois Central Railroad last year earned net \$5,438,562, of which probably more than \$3,000,000 was on its Illinois lines, and the fixed charges secured by these lines were \$594,400—not one-fifth of their net earnings. Therefore any bonds which are a lien on these lines have a security such as few railroad bonds give. Indeed, the whole principal of the bonds now outstanding on these lines amount to little more than their net earnings for three years.

The Southern Division has a much heavier debt, and the interest on it is twice as much, besides which guaranteed dividends of \$400,000 per year are paid as rental, making the total \$1,480,791, which is probably about three-fourths of its net earnings, its gross earnings having been \$4,113,520, which, at the rate of the whole system, brought in about \$1,900,000 net.

On all the property owned or virtually owned by the company, including the Southern and the Illinois lines, the net earnings of which were \$4,912,291, or \$2,950 per mile, the fixed charges (including the guaranteed dividend) were \$2,244,000. A part (\$136,000) of the surplus was required to meet the loss on the leased Iowa lines, but this lease will expire in a year and a half, and as it was, the surplus was \$2,532,000 or \$8.73 per share of stock. Thus the profits can be reduced 53 per cent. before touching the sum required for the guaranteed interest of the Southern leased road's stock, can be reduced 61 per cent. without affecting the bonds of lowest rank; while they can be reduced seven-eighths and still leave enough for the interest on the bonds secured by the Illinois lines. After paying fixed charges, a profit of \$140 suffices to pay 1 per cent. on the stock, and \$1,005 per mile pays all the fixed charges except rentals of the Iowa lines (which may not be kept after next year), which amounted to \$1,647 per mile last year.

One great advantage of this good financial condition is that it enables the company to construct branches when they would not pay any of its competitors. In

Mississippi, for instance, \$800 of profit per year will pay the interest on the cost of roads (\$20,000 permile), which would probably cost any of its competitors \$1,100 per mile per year. The Iowa lines, for which it last year paid a rental of \$1,647 per mile, it could probably replace with lines the interest on the cost of which would be less than \$1,000 per mile.

THE PRCS AND CONS OF THE COUPLER TYPES.

II.

As respects the seventh point of a good coupler, that it shall couple with draw-heads of different level, and admit of up and down motion of each car independently, when coupled, figs. 10 and 11 represent the conditions on uneven track, and by dropping the rails and wheels under the higher car to the level of the lower, and leaving the car-bodies in the same position, the coupling of draw-bars of unequal height is sufficiently well represented.

Theoretically the vertical plane type has here a certain advantage, but it would appear as if far too much has been made of it. Practically, it is by no means to be numbered among the grounds for declaring the link type of coupler inferior to the other, if indeed the latter has not, in this respect, a certain advantage. Theoretically, a coupler of the type of fig. 7 will couple with a difference of level of draw-bars of anything less than its full height, and still give a directly horizontal pull. Practically it will not admit of more than 3 or 4 in. with safety, and a large class of link couplers admit, like fig. 8, of nearly as much; possibly it might be claimed for some of them, quite as much, a difference of about 2 in. being rather an advantage to the coupler than otherwise, as deciding which link shall over-ride the other.

It is superfluous, however, to inquire how this might be under conditions which might exist or could exist, because, under the conditions which do and will exist, differences of more than 3 or 4 in. do not need to be considered. The confusion which formerly prevailed in height of draw-bars is being rapidly eliminated. The vast majority of cars are now built to the Master Car-Builders' standard of 2 ft. 9 in. The Pennsylvania is the only great system which adheres to so great a difference as 2 ft. 11 in., and few or no cars, except a few for special purposes outside of regular service, as gravel cars, are now built to less than 2 ft. 9 in. As uniformity in this respect is so very desirable, and as few or no automatic couplers, whatever type be adopted, will be applied to other than new cars or those undergoing general repairs, it is inconceivable that deviations of more than an inch from the established standard would be adhered to by any road for such new stock. The combined effect of chance variations, difference of load and sagging of ends, should then rarely exceed 3 in., which all couplers of approved design readily admit of.

Some difference of level, however, must exist, both from difference of construction and from irregularities of track. When this exists, the force is, in all cases, transmitted horizontally. In the simplest form of the link type it is transmitted obliquely, so that there is a force tending to pull the draw-bar *d* down and the draw-bar *b* up. It is not this downward pull, however, as is sometimes thoughtlessly claimed, which racks and loosens so many draw-bars and attachments, but the buffing strains in yard work, and buffing strains are transmitted by each type in the same way. Practically, moreover, this obliquity of pull is much less extreme than is outlined in fig. 11, owing to a certain amount of vertical adjustability in all couplers of the link type, automatic and non-automatic.

The link type palpably permits the cars to adjust themselves with less friction to irregularities of the track, for there is only the imperceptible friction at *b* and *d* to resist free vertical movement, whereas in fig. 10 there is the great resisting friction of the vertical faces at *b*. At the head of the train this force may be very considerable. Assuming the tractive force of the locomotive to be 20,000 lbs., it may require a force of 5,000 or 6,000 lbs. to slide the draw-bars vertically on each other. This is not an unmixed disadvantage, for it tends to restrain the cars from bouncing, but on the whole it would appear to be a disadvantage, if a small one.

This conclusion is fair in spite of the fact that, as most railroad men vividly remember, the introduction of passenger vertical plane couplers produced a great amelioration in the riding qualities of passenger cars. That amelioration is due more to close coupling than to any vertical or lateral stability of the couplers, as is evident from the fact that Miller couplers, which have no great lateral stability, ride about as well as the Janney, which gives a fixed hinge laterally. Close coupling is possibly with either type. Riding quali-

ties, moreover, are not what we are after. The riding qualities of freight cars, as they are, are not so bad that humanity to brakemen requires an improvement. Is it clear that a passenger engine can haul at freight speed more cars with the new and better couplings than with the old? That is the practical question for freight service, although it was not so for passenger service.

Appropriately, in this connection, comes up the next vital question, as to whether or not slack is necessary for the utmost efficiency in starting trains, which, more than the grades between stations, is the true limiting cause for the length of most freight trains. Because the loss of slack proved harmless for

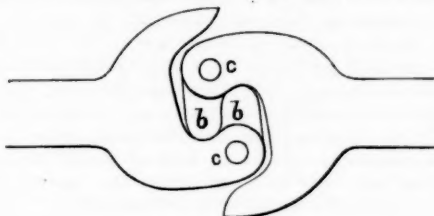


Fig. 6 (Janney).

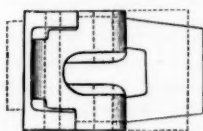


Fig. 7.

passenger service, contrary to the opinion of many, it is sometimes reasoned that similar apprehensions for freight service will prove equally unfounded; but the cases are different. The heaviest regular passenger trains rarely exceed 300 tons in weight, equal to only ten 20-ton cars. The load on drivers of engines hauling such trains is nearly always over half of that of heavy freight engines, and because slack is unnecessary for starting such light trains it does not follow that trains three to five times as heavy can likewise dispense with it. Experiment alone can settle the point positively, but such meagre experimental evidence as exists seems to indicate quite positively that a certain amount of slack is in practice very important for starting the heavier freight trains, as does theory also; and certainly until the contrary has been shown

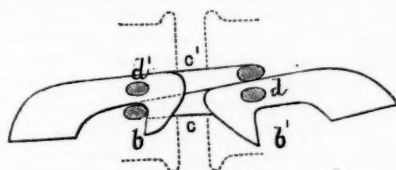


Fig. 8 (Ames).

it would be rash to assume that couplers which entirely eliminate slack, even with the compensating advantage of somewhat easier springs, will not work harm.

On the other hand, the existence of slack is liable to be a great obstacle to the success of freight-train brakes, which are at least an equal desideratum with an automatic coupler. Especially with air brakes, it is still an open question whether trains of 50 or 60 cars can be operated by them successfully, and the existence of any considerable amount of slack may well decide this matter in the negative. Even with the trains of 25 or 30 cars which are now operated in the West with the Westinghouse brake, although no insuperable difficulties have arisen, yet a practice has

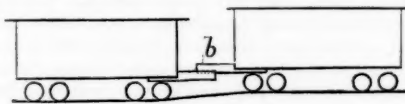


Fig. 10.

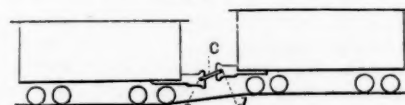


Fig. 11.

been quietly adopted, in many cases, of cutting out all but the first ten or twelve cars, because "the train could be handled so much better," the braking power being still sufficient and the proper manipulation of the brakes much simpler. An "auxiliary discharge valve" has been introduced by the Westinghouse Company to permit the brakes on the front part of the train to be used for ordinary stops, while leaving the whole brake power available for cases of emergency, but we do not understand that its working is

entirely satisfactory. As air-brakes will give, unquestionably, a greater braking power than any of the compression brakes, it would be unfortunate if any adopted coupler should seriously impede their use, unless some other style of train brake should meet acceptance.

It is one of the most meritorious and promising features of brakes of the buffer type, that for them the existence or non-existence of slack will be a less important feature. They work anywhere in the train; they work always when the buffers come together, and they stop working when the buffers separate. The most important unsettled question in regard to them is whether they work efficiently enough to make them satisfactory. That they will ever show as great efficiency as the best air brakes is hardly to be hoped. That, if they did show equal efficiency or nearly equal, they would be beyond doubt the proper brake for freight service will hardly be questioned, despite the great disadvantage that they are not automatic in case of trains breaking in two, which is only partly balanced by the fact that they are automatic behind a derailed car or engine. The unsettled question is—at what point of comparative efficiency will it become an even choice between air and buffer brakes, and do the latter reach or pass it. Judging from such experiences as that stated, as well as from inherent probability, it would appear as if, when it can be shown that buffer brakes give half as much brake power as the air brakes in full action, they will have a nearly equal practical footing before the public. This has not yet been proven, but the proposed brake tests on trains of 50 cars should go far to settle this, if no untoward event prevents their taking place. In the mean time, the danger that an automatic coupler requiring slack might interfere with the successful use of a freight train brake is a real one, and counts in favor of the vertical plane type of coupler, so far as it goes, although none of the more approved link couplers require any great amount of slack for their efficient action, should it appear desirable to eliminate it; and it does not appear that there is any insuperable difficulty in using air brakes on ten or twenty cars with ordinary link couplings.

The tenth point, comparative strength, is one of fact. It would be rash to assert, abstractly, that either type, as such, has an advantage, but of those of each type which have so far had general use, we infer that it must in fairness be admitted that the link type has the advantage. No one of the latter which has been tested on any considerable scale has, to our knowledge, shown any marked weakness compared with common draw-bars, while the same is by no means true of couplers of the vertical plane type. The hinged part which, in every one of the more approved couplers of that type, sustains the buffing strains is an element of weakness, and of great weakness, in some of the more prominent of them. Under proper and intelligent treatment, such as passenger cars have, it is less so, but the treatment of freight cars, especially during the long period of transition which is before us, cannot be counted on as either proper or intelligent, and we have lately seen an appalling heap of fragments from a trial lot of 50 couplers of this type which might well raise just apprehensions that the coupler would prove a failure on a large scale, although many of the fractures may have been due to malicious or reckless experimenting. Buffing the cars with the hinges set so as not to couple is especially dangerous to many couplers of this type, and may well occur frequently by accident in the hasty and careless yard work which is so common.

The next point, that couplers shall never accidentally uncouple, does not seem to be one on which many couplers of either type fail in ordinary service, although in cases of derailment or other violent disturbance some of them will permit uncoupling and others will not. Which result tends most to safety it would be hard to say. In the *Railroad Gazette* of June 26, 1885, two contrasting instances were given by a correspondent, in one of which the breaking of a coupling, and in the other the holding, prevented a serious accident. Contrasts without number of this kind may be picked out from our accident record. The link type is the more likely to separate in case of accident, undoubtedly, although in the two instances given it was the link which held and the hook which gave way.

As respects the twelfth point, coupling automatically with other couplers, it is fortunate, indeed, that whenever a coupler of either of the types has been selected, a number of others of that type either will or can be made to couple with it automatically. All that is really important, therefore, is to select a type, with perhaps an added proviso that all other couplers used of that type should couple automatically with the

avored one of that type. There will be no danger of any monopoly, for the contest between individual couplers will still be a hot one after the choice between the types is practically complete, either by official action or the slow progress of events.

Finally there is the last condition, which many not unreasonably claim is by far the most important of all, that the selected coupler should couple readily with draw-heads of common type, with the least possible danger to employes. On this point it can hardly be questioned that the more approved couplers of the link type have a very decided advantage, which results in two ways:

A long period of transition is before us, of anywhere from ten to twenty years, before the all but assured result of an automatic coupler in general use is attained. In the first part of that period automatic couplers will be unfamiliar to many employes from their infrequency. In the last part, the still more dangerous condition will obtain that skill in the sleight-of-hand trick of coupling with a common link, and in so handling the train as to make it safe, will be decreasing from lack of practice. In the middle of the period half the cars will have an automatic and half a common coupler, and as they cannot be assorted accordingly, the tendency will be to have these cars sandwiched in between each other alternately, so that perhaps three-quarters of the couplings will be with the common link after half the cars are equipped with automatic couplings. Under these circumstances, all the more prominent link couplers will hold up their own link in position to couple, and some of them carry their own link permanently attached, so that, although it will still be necessary to drop the pin by hand, the more dangerous feat of guiding the link into the draw-bar will not be necessary, nor (with some couplers) the use of loose links at all.

With all the vertical plane couplers the use of loose links in the old way will still be necessary, and there will be such further disadvantage as is due to the second cause of difficulty, that the differing form of the hook couplers, although with adequate practice and care there may be no increase of danger, or even a decrease, will require a certain difference in the motions of coupling which will be apt to produce a dangerous uncertainty or error. It is like the question of single or double dead-blocks. Either is better than both mixed in together. The Cowell seems to have most ingeniously and effectually overcome this difficulty in combining, as it does, many of the advantages of both types.

"The conclusion of the whole matter" we shall not attempt to draw, further than to close as we began, by saying that "all reasonable unbiased men who have studied the situation would hail with the greatest satisfaction any decided tendency toward either type which would put the other completely out of the game. However much interested or biased advocates may urge that their type alone should be adopted, this result alone, we believe, is what disinterested men who desire only the public good in the matter are very anxious to see come about." So long as the contest hangs unsettled, it is every man's right and duty to do what he can to favor the type which he believes in. So soon as he perceives a decided tendency toward either type, it will be almost criminal to insist on his personal preferences at the expense of continuing confusion and doubt.

Chicago Shipments Eastward in February.

Chicago through rail shipments eastward in February, by the complete report, including all classes of freight, have been as follows for the past eight years, in tons:

Year.	Tons.	Year.	Tons.
1879.....	168,541	1883.....	234,232
1880.....	169,181	1884.....	234,704
1881.....	207,790	1885.....	259,371
1882.....	225,815	1886.....	217,030

Thus the shipments of the month this year were larger than in four and smaller than in three of the seven previous years, and a little more than the average of the seven; but the decrease from last year is 16½ per cent. The estimates which we had made of not less than 18,000 tons per week of high-class and other freight not included in the weekly Chicago statements is confirmed by this report, which shows 58,847 tons more than the weekly reports of flour, grain and provision amount to—14,712 tons per week. Last year this unreported freight amounted to but 38,350 tons, which indicates an important growth in the high-class freight, and earnings larger in proportion than the traffic. Rates were probably not more than 20 cents per 100 lbs. for grain last year, and very likely less, and the earnings from the shipments must have been the larger this year, but much less than under the

30-cent rate of 1883 the 35-cent rate of 1881, or even the 40-cent rate of 1880, when the shipments were less than in any other year, but when they yielded \$125 of earnings for every \$100 this year. As the five railroads which carried all the traffic in 1880 have but about 70 per cent. of it now, they earned nearly \$180 in 1880 for every \$100 this year, and their net earnings from the traffic must have been something like \$280 then for every \$100 now.

These figures do not include the live stock and dressed beef shipments, which increase from year to year, though not very rapidly, averaging 37,242 tons per month in 1880 and 42,721 tons in 1885. The inclusion of this would make the comparison worse, however, for there was practically no profit on the business this year, while 1880 was one of the few seasons when profitable rates were maintained on it. The comparison with other years, however, would be less unfavorable for this traffic, on which a little profit was made at this time last year, however, notwithstanding which the total February shipments doubtless returned larger profits this year than last, but much less than in 1880, 1881 and 1883.

For the two months ending with February the Chicago through freight shipments have been:

Year.	Tons.	Year.	Tons.
1879.....	392,053	1883.....	505,394
1880.....	334,075	1884.....	430,493
1881.....	475,436	1885.....	581,444
1882.....	516,963	1886.....	384,605

Thus the shipments this year were less than in any other except 1880, and were 196,749 tons (34 per cent.) less than last year. We have seen that the February shipments were exceeded in but three of the seven previous years, and were but 16½ per cent. less than last year. Therefore the smallness of the shipments for the two months was due to the very light shipments last January. These January shipments have been:

Year.	Tons.	Year.	Tons.
1879.....	192,512	1883.....	271,162
1880.....	165,494	1884.....	234,704
1881.....	267,046	1885.....	322,073
1882.....	321,148	1886.....	167,965

Thus the shipments in January were little more than half as great this year as last, and, allowing for shipments at junction points not included until 1884, were less than in any other January. Therefore February shows a great improvement over January, the average daily shipments having been, in tons:

Year.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
Jan....	6,210	5,338	8,634	10,360	8,747	7,571	10,390	5,408
Feb....	7,091	5,834	7,421	8,065	8,365	6,751	9,263	7,751

Only in 1879 and 1880 in previous years have the average daily shipments been more in February than in January, but this year they were the larger in February by 43 per cent., which is altogether unprecedented, without a reduction in rates, but can hardly be called unnatural, since the increase is from an exceptionally small business in January, and does not make the February business very large. That is, it was the smallness of the January shipments that was phenomenal, not the largeness of the February shipments.

We have now come to the time of year when last year and the year before the grain rate went down to 15 cents and the shipments became enormous—the time when, apparently, it is most difficult to maintain rates. The large accumulations of grain in the elevators frequently cannot be obtained at all at this time by the railroads except at very low rates, because the opening of navigation is close at hand, and it seems to have been irresistibly tempting to some roads to empty the elevators before the vessels could compete for this grain, without much regard to the rates obtained for the business, the inevitable effect of which was to make the vessels sharper competitors for the grain arriving after navigation opened. When 35 and 40-cent rates were obtained in winter, as in 1880 and 1881, a reduction a month or so before the opening of navigation was rational, securing large amounts at profitable rates. Thus in 1880 the rate was reduced from 40 to 35 March 1, with the result that 321,856 tons were shipped in March, against 165,494 in January and 169,181 in February, this March being doubtless the most profitable month's business the Chicago roads ever had. We estimate that for every \$100 of profit in February they made \$152 in March, the reduction of one-eighth in the rate reducing the profit one-fifth; but a reduction from 25 to 20 means a reduction of one-half in the profit, while the reductions to 15 cents last year and the years before took the whole of it. The railroads will doubtless have to come down to a 20-cent rate when navigation opens, or abandon substantially all of the export grain, and the grain for the supply of New York city and vicinity (which can be carried by canal), to the lake and canal route; for a little time before navigation opens this may be true also, as the grain may be held to take advantage of the water rates, as indeed it is all winter to a greater or less extent.

It seems to us doubtful, however, whether it pays the railroads to compete for the carriage of the export grain and to reduce their rates even to 20 cents to secure a share of it. Generally speaking, they have to haul back empty the cars that bring this grain, there being plenty of others to carry all the west-bound freight; and they would carry by far the larger part of the grain required for domestic consumption, and all the flour, at a 25-cent as well as at a 20-cent rate. As, however, the consumption of New York city and vicinity and some other places on the canal forms a very large proportion of the grain business of some of the railroads, they will probably not consent to a rate which might deprive them of a large part of their domestic business, though it would be but a small part of the total domestic business; and we shall doubtless again the coming season, as for the two last past, have a 20-cent rate, at least as soon as navigation opens, yielding but a minute profit to anybody.

There seems to be no reason why there should not be a tolerable traffic at such rate, there being a good stock of corn and provisions, and wheat never making a great figure from this time until after harvest; and there is still greater reason to expect that the business will be more profitable than in the past two years, when, until July at least, shipments were enormous at a 15-cent rate and profits nil. But it will require a very great improvement over these two years to enable the railroads to do fairly well, and it is not easy to see how it can be made with a 20-cent rate.

The transcontinental railroad war continues unabated and even aggravated, the "Sunset Route" taking freight of all classes from New York to San Francisco for 75 cents per 100 lbs., which is the first-class rate from New York to Chicago, while a rate of 30 cents from Chicago to San Francisco is reported, the distance being 2,350 miles—about equivalent to 12 cents from New York to Chicago. In passenger fares there seems little change west-bound from last week; but a telegram from Los Angeles, March 7, says that the Southern Pacific was selling limited tickets to Kansas City the day before for \$1 and to Chicago for \$7! the distance to Kansas City being 1,891 miles, or nearly twice as far as from New York to Chicago. The same telegram says there was an advance on the 7th to \$10 for limited first-class and \$8 for immigrant tickets from Los Angeles to Kansas City, \$15 and \$13 to Chicago and \$28 and \$25 to New York, at which rates one would suppose that California would empty itself unless it very much desires to stay at home.

Meanwhile negotiations have been going on in New York for a way out of the difficulty, the origin of which seems to have been a childish insistence on unimportant particulars not very creditable to men conducting an important business. It has been suggested that instead of the transcontinental roads dividing the whole east-bound and west-bound transcontinental traffic, they divide only the traffic which originates on their own lines, and allow their connections to do the same. This would make the Southern Pacific and the Atlantic & Pacific divide the shipments from California to the East, and that only, each of these then dividing its share of the business among its several connections. In the East, the west-bound traffic would be divided between the trunk lines on the one hand and the Sunset Route (steamer to New Orleans) on the other. The share of the trunk lines would be divided among their western connections like all other freight in the trunk-line pool; this and freight originating on the western connections of the trunk lines would be divided by them by agreement among the lines in the "Pacific Coast Association" from Chicago and St. Louis to the Missouri River, and by these roads among the transcontinental lines west of the Missouri. This would recognize the fact that the line on which the business originates has the most power to determine what route it shall take. At latest accounts it seemed possible that a division on this basis might be left to arbitration.

Mr. Blanchard is working very energetically and effectively to establish pools at the leading Western points. The Chicago roads (not including the Chicago & Atlantic) signed their agreement some time ago; the St. Louis roads have completed theirs, and last week the Peoria roads agreed to a plan leaving the apportionment of the traffic to Mr. Fink, of the Trunk Line Association, and Mr. Richardson, Commissioner of the Ohio River pool.

At the same time there was negotiation for a new agreement at Indianapolis, in place of the old, which

recently expired. Some points were left to be determined by arbitration, Commissioners Fink, Blanchard, and a third person to be elected by them, to be arbitrators.

The movement of freight eastward from Chicago last January was small without precedent, and the receipts at the seaboard cities were also small, but the total movement of through freight from the West to the East, including all going further east than the western termini of the trunk lines (Buffalo, Pittsburgh, etc.), though much smaller than last year, was not so much smaller as the Chicago shipments would indicate, having been, in tons:

1880.	1882.	1883.	1884.	1885.	1886.
531,238	740,093	853,251	509,019	740,873	648,317

These shipments were not reported in 18-1.

It appears from this that the total eastward movement in January this year was 12½ per cent. less than last year or in 1882, and 24 per cent. less than in 1883, when the movement was largest, but was 8½ per cent. more than in 1884 and 22 per cent. more than in 1880.

The rates on this freight were enough higher this year to make the earnings from it probably a little larger this year than last, and the profits considerably larger, they being very small last year. In 1880, when the movement was smallest, the gross earnings from this business were nearly one third greater than this year or last, but somewhat less than in 1883, when, however, the net earnings (from 60 per cent. more traffic) were hardly as large as in 1880, the rate being 10 cents less per 100 lbs.

The largeness of this east-bound movement at a time when the seaboard receipts were light emphasizes the growing importance of the shipments to the interior stations in the East—a business of which we get no trace in ordinary statistics, but which grows with scarcely any interruption, and which seems to have grown very largely in the last few years, and to have made up in part for the great decrease in our exports.

Chicago, Burlington & Quincy Earnings in January

The Chicago, Burlington & Quincy Railroad keeps its reputation for extraordinary fluctuations in earnings from month to month by its January report, which shows a loss such as on almost any other railroad would be alarming, the net earnings being not half as great as last year. Its gross and net earnings and working expenses in January for seven years have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1880.....	1,857	\$1,432,740	\$651,394	\$781,346
1881.....	2,772	1,307,948	711,890	596,058
1882.....	2,924	1,658,834	888,919	769,915
1883.....	3,229	1,625,680	818,283	807,397
1884.....	3,331	1,648,220	1,012,705	635,515
1885.....	3,467	1,692,484	1,139,954	552,530
1886.....	3,590	1,386,721	984,359	402,362

Thus the gross earnings this year were less than in any other except 1881, and but 6 per cent. more than then though there is 30 per cent. more road. The working expenses were reduced somewhat in spite of the snow blockades, which tended to increase them, and were probably worse on this road, taking it as a whole, than on any other; yet the net earnings were very much less than in any other January. Compared with last year the decreases are:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$605,763 30.4	\$145,555 12.9	\$460,208 53.3

This decrease in net earnings is at the rate of nearly 60 cents per share of stock, and the net earnings last January were considerably less than the month's proportion of the fixed charges, which seems astounding for a company like this, which on the average has an enormous surplus, averaging in 1884 \$587,000 per month.

But there have been so many cases of single months with very bad earnings on this road that this very poor showing will hardly disturb any one. It is, indeed, nearly the worst showing the road has made since the Nebraska lines were acquired, only February of 1881 surpassing it in badness, with but \$322,825 of net earnings, against \$402,322 last January; and even that February the net earnings were \$116 per mile, against \$112 last January. But we have to go back no farther than January of last year to find a very bad month, the net earnings then being but \$498,688, against \$862,530 the month before, and \$1,381,940 the month after.

How the gross earnings of this road sometimes fluctuate in the winter months may be seen by the following statement of them in several years:

	December.	January.	February.	March.
1880-81.....	\$1,552,018	\$1,307,948	\$1,034,821	\$1,418,149
1882-83.....	2,027,060	1,625,680	1,611,021	2,396,584
1883-84.....	2,170,918	1,648,220	1,971,013	2,103,029
1884-85.....	2,060,298	1,692,484	1,601,915	2,639,169
1885-86.....	2,329,974	1,387,721		

Extraordinarily small earnings in any month are likely to be followed by extraordinarily large ones in the following month. This was not the case in 1881, though March showed a gain of 37 per cent. over February, but then March was a month of terrible blockades as well as February. In 1884 the small earnings in January were made good by exceptionally large earnings in February; last year the small earnings in February were more than made good by the extraordinary earnings in March.

It is not probable that the very small earnings last January were due wholly to the weather, for the weather was not so bad as it has been in some other months of other years, pretty good evidence of which is the fact that the pas-

senger earnings were 3½ per cent. more than last year. The movement of produce to market was very light in January where there were no blockades; and on the Burlington the January business seems to have been, to some extent, anticipated, for the earnings were unusually large last December. Taking December and January together, the earnings were less than last year indeed (\$3,717,695 against \$4,052,782), but nearly as much as the year before, and more than in any previous winter.

There was a much heavier crop movement in February than in January, and the weather was generally not unfavorable, and as the month was bad last year, a gain may be expected this year, though probably not quite enough to make the earnings of the three winter months as great as they were last year.

The Proposed Reform in Bridge Specifications.

The worm will turn. On Tuesday next, an important convention will be held at Pittsburgh, called by the leading bridge manufacturers of the country, to secure agreements, if possible, between them and the designers and users of iron bridges, as to a standard form of specifications relating to materials and workmanship, which the manufacturers will submit on that occasion. This is entirely in accord with the tendency of the times towards the organization of class interests, and the establishment of uniform standards of practice. It has been apparent for some time that a movement of this kind was needed, as the time seems to have clearly arrived for formulating the best experience of the country in this branch of engineering practice.

That the first effort in this direction has come from the manufacturers is most natural, since they have so often been the victims of amateur engineering, and the only wonder is that they have never united before in the matter. Engineers of large experience and observation have usually learned not to be unreasonable in their demands, but so much work is entrusted to inexperienced men, or to men whose aspirations after originality cause them to reject well proved practice, that any protection against the vagaries of such a class is in the interest both of progressive engineering and of sound sense. There are some men so constituted that whatever others do is wrong, and that what they evolve from their inner consciousness must be controlling. It is amusing to the bystander but hardly to manufacturers to look over the innumerable specifications put forth the last ten or a dozen years, and see how often engineers endeavor to be original, by changing phraseology, by contriving some clause, or making some exactions, which will (in their own judgment) stamp them as so much better informed than their competitors. Progress and changes, to be sure, are necessary, but arbitrary exactions, made purely for the sake of doing something different from common practice or experience, are the bane of contracting engineers or manufacturers, and are too common.

In this particular branch of engineering the capabilities of iron, at least, would appear to be about as well known as they ever will be, and there should be no great difficulty in formulating a standard of quality and strength that will last for all time. So far as steel is concerned, it is to be regretted that so much cannot be said, as it is a subject which manufacturers and engineers at present handle very tenderly. Nevertheless, the best practice of the day should be formulated, subject to future developments as greater experience and knowledge are gained.

Many bridge specifications for bridge steel, as for steel rails, have been put forth wherein the engineer has called for certain physical properties of the metal, at the same time assuming to dictate its chemical composition, a combination of exactions which is surprising manufacturers could have been found to undertake, for such requirements mean endless delay, excessive cost and very probably quarrelling. Hair-splitting exactions of all kinds, moreover, have no business in any specifications; they can rarely be conformed to without needless loss, and cause endless contention and bickering if administered by a strict constructionist.

One branch of the subject especially deserves notice and reform, the occasional practice of sending inexperienced men to workshops as inspectors, such as the bright young man fresh from the polytechnic school, who, with specifications in one hand and "the book" in the other, go about the shop to pass upon practical questions that only years in actual contact with work will mature their judgment upon. An inspector unfamiliar with shop practice or inexperienced in the behavior of metals is rather worse than useless to his employer, and is the laughing stock of the shop to which he is assigned, where his vanity perhaps is worked upon to make him harmless, or such good feeling engendered as to cause all work turned out by that shop to be unexceptionably good.

Just what standard specifications for the metals of construction and for their fabrication will be agreed upon at Pittsburgh next week we are unable to say. A proposed form has been sent out, but it is subject to amendment, and we do not care to pronounce judgment on those submitted by the manufacturers in advance of the meeting, under these circumstances. While it is reasonable to expect that the manufacturers will endeavor to have as lenient specifications adopted as is consistent with sound practice, and some of them, it may well be, a little more than that, yet the names of the signers to the call for the meeting are a guarantee that no sacrifices of good work will be sought for the sake of easing the shop or the mill, but that the only desire is to protect themselves from arbitrary exactions that vanity or ignorance often impose upon them. In this desire they are quite right, and should have the cordial co-operation and assistance of all engineers.

We have reports of February earnings from 25 more rail-

roads this week, no less than 20 of which have a gain over their earnings last year, which were generally unfavorable, while the delays in January this year tended to make the February earnings larger. The earnings for the month are given below for five successive years for the roads that have had a considerable mileage so long, beginning with the extreme Northwest:

	1882.	1883.	1884.	1885.	1886.
Or. Ry. & Nav.....	\$269,284	\$282,238	\$187,503	\$266,882	\$303,070
Can. Pac.....	103,571	103,571	234,638	400,577	465,000
Den. & R. G.....	303,393	437,335	331,371	395,308	428,818
St. P. & D.....	54,302	63,038	54,051	56,908	71,808
C. & N. W.....	1,474,176	1,311,395	1,504,100	1,479,808	1,603,800
C. M., St. P. & O.....	333,439	283,601	331,453	307,643	385,300
Ill. Cen. in Iowa.....	156,083	129,824	111,642	100,859	121,029
Chic. & Alton.....	517,897	557,384	673,284	537,322	541,394
Ill. Cen.....	831,362	847,439	813,679	843,912	890,398
Ill. & S. Div.....	27,367	40,606	48,546	46,441	56,104
Peoria D. & E.....	57,903	45,07	56,592	55,532	61,845
C. L., S. L. & C.....	188,072	141,356	122,086	172,544	200,574
Chic. & W. Mich.....	113,815	99,672	108,247	87,498	96,143
Det. L. & N.....	108,811	92,273	93,094	85,710	82,557
Flint. & P. M.....	190,883	164,954	180,589	159,764	156,971
Louis. & ash.....	96,315	1,014,807	1,015,451	1,083,308	1,062,460
Noble & O.....	113,599	108,245	161,283	144,491	148,531
Norfolk & W.....	149,539	181,344	232,357	198,082	197,397
Long I.....	114,140	128,59	138,181	137,536	138,119

We find here that while nearly all the roads have a gain over last year, several of these earned less this year than in 1884, as the Chicago & Alton, the Iowa lines of the Illinois Central, the three Michigan roads, the Mobile & Ohio and the Norfolk & Western. On the other hand, the Oregon Navigation Co., the St. Paul & Duluth, the Chicago & Northwestern, the St. Paul & Omaha, the Peoria, Decatur & Evansville, and the Cincinnati, Indianapolis, St. Louis & Chicago, all earned more this year than in any previous February, and the month as a whole makes a favorable showing.

Chicago through rail shipments eastward for the week ending March 6 have been as follows, according to the complete report, which includes all classes of freight, except for the last two years, when only flour, grain and provisions are reported, and these incompletely:

1880.	1881.	1882.	1883.	1884.	1885.	1886.
54,355	28,085	48,681	72,051	42,462	60,981	45,214

Thus the shipments this year were one-fourth less than last year; but allowing for the unreported higher class freights, they were probably as much as 58,500 tons, which is more than in any year previous to last year except 1883. The very small shipments of 1881 in this week were due to what was probably the worst snow blockade that ever occurred. At this time last year rates began to go to pieces badly, and shipments to increase.

For seven successive weeks the total Chicago shipments and the percentage taken by each railroad have been:

Tons:	Week ending.						
	Jan. 23.	Jan. 30.	Feb. 6.	Feb. 13.	Feb. 20.	Feb. 27.	Mar. 6.
Flour.....	4,416	3,551	5,564	4,366	6,247	4,972	3,966
Grain.....	12,736	12,344	17,898	23,789	34,851	30,000	34,923
Provisions.....	8,890	9,351	9,738	9,348	7,048	5,392	7,225
Total.....	25,952	25,246	33,170	36,503	48,146	40,364	45,214
Per cent.:							
C. & Grand T.....	7.5	9.0	8.5	13.1	22.7	21.9	22.2
Mich. Cen.....	12.0	12.0	12.1	11.4	11.7	21.2	27.8
Lake Shore.....	10.3	13.5	13.2	11.4	8.4	9.4	17.6
Nickel Plate.....	8.3	7.5	11.1	10.7	15.6	16.9	22.7
St. Wayne.....	18.1	21.6	18.9	18.1	16.4	10.5	10.6
C. St. L. & P.....	12.4	16.1	13.2	13.1	15.1	9.7	6.1
Balt. & Ohio.....	14.9	11.1	11.3	6.4	4.4	4.0	8.3
Ch. & Atlantic.....	10.5	9.2	11.7	9.7	5.7	6.4	4.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The total shipments last week were thus 4,850 tons (12 per cent.) more than the week before, and 2,934 less than two weeks before, but, with this exception, they were the largest since November. Compared with the previous week there was a large decrease (20 per cent.) in flour, but an increase of 13.4 per cent. in grain, and 34 per cent. in provisions, though the latter remains much smaller than usual.

The percentages of the different lines were even more unusual than in the two weeks previous, the most astounding change being the sudden almost total cessation of shipments by the Nickel Plate, its percentage, which for the previous three weeks had averaged 16.4 per cent., falling to 2.7. Its loss did not go to the Pennsylvania lines, which were so far behind the week before, but to the Lake Shore and the Michigan Central, both of which, we believe, are behind in the pool. The Chicago & Grand Trunk keeps its high percentage of the two previous weeks; but the two Pennsylvania roads together carried but 18.7 per cent. of the whole, having once this winter had 40 per cent., and for the six weeks ending Feb. 20 averaging 33.6 per cent. The Baltimore & Ohio gained largely.

The great changes are best seen by examining the grain shipments by themselves, which for six weeks have been:

	Jan. 30.	Feb. 6.	Feb. 13.	Feb. 20.	Feb. 27.	Mar. 6.
C. & Grand T.....	1,015	1,043	2,772	5,392	7,475	8,461
Mich. Cen.....	1,903	2,509	2,919	3,933	7,584	11,325
Lake Shore.....	1,240	1,995	2,457	2,482	2,103	5,918
Nickel Plate.....	1,184	1,909	4,992	6,934	5,895	559
Fort Wayne.....	2,143	2,132	3,193	4,860	2,229	2,099
C. St. L. & P.....	1,145	1,708	1,842	3,476	1,567	760
Balt. & O.....	1,951	2,220	1,190	965	705	2,576
C. & Atlantic.....	2,163	3,062	3,533	2,619	2,432	2,123
Total.....	12,344	17,868	22,769	34,851	30,000	34,923

The sudden great increase on the Nickel Plate is exceeded by the sudden decrease, or rather cessation, of the shipments last week, falling from 5,895 to 559 tons, while the Lake Shore, long carrying much less than its share, rises from 2,103 to 5,918, and the Baltimore & Ohio from 705 to 2,576.

That this is an artificial change may well be believed; but it is an artificiality that may be welcomed, for the great changes seem to have been for the purpose of making up the shortages of some of the roads.

Lake navigation may be open within three weeks, and almost certainly will be within seven weeks, and the near-

ness of the time already has a decided effect on grain shipments. Vessels wintering in Chicago are now receiving grain which they will store till the Straits open, and then take to Buffalo, all for 2½ cents a bushel. This assures a low opening rate, and that the railroads will not be able to get more than 20 cents per 100 lbs. as their summer rate on grain. There should, it would seem, be better employment for vessels than there was last year. A larger lumber traffic and a larger ore traffic are certain, and this will take off some vessels. There may be a larger grain traffic too; there is not so much wheat on the Northwestern farms, but there is almost as much in the elevators at lake ports, and the amount of corn that can be spared should be very much larger than last year. But if there is no more, or even if there is less, there is likely to be more for the lake vessels, for the railroads will not be likely to take it for 15 cents per 100 lbs., as they did for a large part of the season last year, by which they secured a very large traffic without any profit.

Prof. George L. Vose has resigned the professorship of Civil Engineering in the Massachusetts Institute of Technology, and will close his connection with that institution at the end of the present academic year. The reason for this action is a difference of opinion between Prof. Vose and the Faculty, in regard to the proper method of teaching; Prof. Vose inclining more to the practical side of the question, and the Faculty, in accordance with the traditions of the school, adhering to the more theoretical side.

Sweden is about to try two American locomotive boilers which are being built by the Dickson Manufacturing Company at Scranton. Though made to Swedish drawings, the boilers will be of essentially American design, with iron flues, steel fire-box, Richardson pop safety valves and Monitor injectors. We understand that the two boilers are to be delivered at Gothenburg for \$3,500. As the boilers are small, this price is probably higher than that of a boiler made of similar materials in Sweden, but is lower than a boiler fitted with copper fire-box and brass tubes. The results of this experiment with steel fire-boxes will be awaited with much interest.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Staten Island Rapid Transit.—Extended from Clifton, N. Y., to Elm Park, 4¼ miles.

Wisconsin Central.—Extended north to the line of Cook County, Ill., 6 miles; also from Burlington, Wis., south 9 miles.

This is a total of 19¾ miles on 2 lines, making in all 213 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles.		Miles.
1886	213	1881	427	1876	285
1885	131	1880	733	1875	99
1884	286	1879	304	1874	180
1883	329	1878	215	1873	348
1882	823	1877	102	1872	568

These figures include main track only, second tracks and sidings not being counted.

TRADE CATALOGUES.

The Perfected Baker Heater.—This publication, of which a second edition has just been issued by the Baker Heater Company, of New York, describes and illustrates very clearly the details of the improved form of heater recently introduced by Mr. W. C. Baker. This pamphlet will well repay perusal by those interested in the subject of handling cars, while the clear and concise manner in which the various points are described and illustrated may afford valuable hints to those engaged in preparing similar works on other subjects.

The Holly System of Water-works and the Gaskill Pumping Engine, manufactured by the Holly Manufacturing Company, Lockport, N. Y.

This is really quite an elaborate treatise on pumping engines, illustrated with numerous engravings showing both the details and general arrangement of the Gaskill pumping engines, with several tables and numerous statistics and reports of scientific tests.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago & Alton, annual meeting, at the office in Chicago, April 5.

Chicago, St. Louis & Pittsburgh, annual meeting, at the Union depot in Indianapolis, Ind., March 17.

New York Central & Hudson River, annual meeting, at the office in Albany, N. Y., April 21. Transfer books close March 15.

Pennsylvania Railroad, annual election, at the office in Philadelphia, March 23.

St. Louis & Cairo, special meeting, to vote on the question of leasing the road to the Mobile & Ohio, in New York, March 15.

Union Pacific, annual meeting, at the Meionaon in Boston, at 10 a. m., on March 31.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Lehigh Valley, 1 per cent., quarterly, payable April 15, to stockholders of record on March 20.

Manhattan, 1½ per cent., quarterly, payable April 1, to stockholders of record on March 20.

New York & Harlem, 2 per cent., from profits of city line, payable April 1, to stockholders of record on March 15.

This is in addition to the 8 per cent. paid by the lessee, making 10 per cent. for the year.

Western Union Telegraph Co., 1½ per cent., quarterly, payable April 15, in scrip convertible into stock of the company.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *National Association of General Passenger & Ticket Agents* will meet in Chicago, on Tuesday, March 16.

The *Southern Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *General Time Convention* will hold its spring meeting at the Grand Hotel in Cincinnati, on Wednesday, April 14.

The *Association of American Railroad Superintendents* will hold its next meeting in Cincinnati on Thursday, April 15.

The *American Society of Mechanical Engineers* will hold its next meeting in Chicago, on Tuesday, May 25.

The *Master Car-Builders' Club* will hold its regular monthly meetings through the winter at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Foreclosure Sales.

The *Wheeling & Lake Erie* road will be sold in Cleveland, O., March 30, under the decree of foreclosure recently granted by the United States Circuit Court.

The property of the *Southern Telegraph Co.* will be sold at the Custom House in Richmond, Va., March 27, at noon, by A. L. Boulware and H. B. Turner, Commissioners, under decrees of the United States Circuit Court. The property consists of a line from Washington to Selma, Ala., with branches, about 1,800 miles of poles and 5,000 miles of wire. The terms of sale are 10 per cent. in cash and a sufficient additional sum to make up \$50,000; the balance in 30 days. Further information can be obtained from A. L. Boulware, Receiver, Richmond, Va. The sale will include the entire property.

ELECTIONS AND APPOINTMENTS.

Atlanta & Charlotte Air Line.—At the annual meeting in New York, March 10, the following directors were elected: Eugene Kelly, H. N. Twombly, P. P. Dickinson, James H. Young, Richard Irvin, Jr., R. A. Lancaster, H. W. Sibley, James E. Grannis, Hiram Sibley, R. R. McAlpine, Skipwith Wilmer, Robert Stobo. The road is leased to the Richmond & Danville.

Atlantic & Danville.—Mr. John A. Gee has been appointed General Superintendent, with office at Hicksford, Va. He has been on the Richmond & Danville road for 15 years past.

Central Vermont.—Mr. F. H. Brown is appointed Freight Agent at Montreal in place of Mr. George B. Phippen, transferred to the Boston office.

Chicago, Burlington & Northern.—Mr. Glenn W. Traer having resigned, to engage in other business, Mr. Frank Dabney is appointed Cashier, with office at St. Paul, Minn., taking effect March 1.

Chicago & Eastern Illinois.—President H. H. Stevens announces that "Mr. O. S. Lyford, now General Superintendent, is hereby appointed General Manager."

Mr. Lyford announces the following appointments: "Mr. D. R. Paterson is appointed Assistant to the General Manager, in addition to his duties as Purchasing Agent. Mr. P. W. Drew is appointed Assistant Superintendent. He will have charge of train and station service, in addition to his duties as Superintendent of Telegraph."

Cleveland, Columbus, Cincinnati & Indianapolis.—The following order has been issued by General Passenger Agent A. J. Smith: "Mr. John Howard, Traveling Passenger Agent, with headquarters at Fort Worth, Texas, having resigned, the territory heretofore assigned him will be placed in charge of Traveling Passenger Agents W. F. Snyder and J. L. A. Thomas, with headquarters at Kansas City, Mo., and Denver, Col., respectively."

"Mr. C. A. Cairns, as Editor, has been placed in charge of the *Bee Line Gazette*."

Dakota Midland.—The office of Mr. Wm. H. Becker, President and General Manager, has been removed from Ellendale to Fargo, Dakota.

Duluth, Huron & Denver.—The officers of this new company are: President, John F. Conkey, Dubuque, Ia.; Vice-President, C. E. Mabie, Waterloo, Ia.; Secretary, C. M. Harrison, Huron, Dak.; Treasurer, L. Dunley.

Eastern Kentucky.—C. D. Van Bibber is now Auditor of this company, with office at Riverton, Kentucky.

East Tennessee, Virginia & Georgia.—The following circular from W. H. Thomas, Superintendent of Motive Power, is dated Knoxville, Feb. 23: "Mr. J. B. Michael is appointed Master Mechanic of the Alabama Division, with headquarters at Selma, Ala., vice Mr. Simon Gay, transferred. Appointment taking effect March 1."

Gulf, Colorado & Santa Fe.—Mr. W. H. Masters, heretofore General Freight and Passenger Agent, will hereafter be General Freight Agent only, the office having been divided on account of increasing business. Mr. J. S. Clark is appointed General Passenger and Ticket Agent, with office in Galveston, Tex. Mr. Clark was recently on the Louisville, Evansville & St. Louis road.

Illinois Central.—At the annual meeting in Chicago, March 10, the following directors (one-fourth of the board) were elected for four years: John Elliott, Oliver Harriman and Levi P. Morton.

Little Rock & St. Louis.—The officers of this new company are: President, George D. Bancum; Secretary, D. G. Fones; Treasurer, W. B. Worther; Chief Engineer, W. P. Homan. Office in Little Rock, Arkansas.

Louisville, Evansville & St. Louis.—Mr. George W. Curtis is Acting General Passenger Agent in place of J. G. Clark, resigned.

Louisville, New Albany & Chicago.—At the annual meeting in New York, March 10, the following directors were elected: John J. Astor, Robert Lenox Kennedy, Samuel Sloan, R. G. Rolston, James Roosevelt, William Dowd, Elihu Root, James D. Smith, New York; Robert R. Hitt, C. R. Cummings, of Illinois; John B. Carson, H. H. Cook, G. M. Fetter, of Kentucky.

Missouri Pacific.—At the annual meeting in St. Louis, March 9, the following directors were elected: Jay Gould, Russell Sage, George J. Gould, Henry G. Marquand, George

J. Forrest, Samuel Sloan, A. L. Hopkins, R. S. Noyes, Thomas T. Eckert, Sidney Dillon, Fred L. Ames, S. H. H. Clarke, H. M. Hoxie.

Muskegon, Grand Rapids & Indiana.—This new company has elected the following officers: President, W. O. Hugbart; Vice-President, N. McGraft, Muskegon, Mich.; Treasurer, W. R. Shelby; Secretary, J. H. P. Hugbart; Auditor, F. A. Gorham; Engineer, Stuart Johnson; Counselor, L. N. Keating, Muskegon.

Nashville, Chattanooga & St. Louis.—J. W. Thomas, President, announced on Feb. 18, that owing to the death of R. C. Bransford, Treasurer, J. H. Ambrose had been appointed Acting Treasurer; and that all remittances for this company should be made to him, and checks drawn payable to his order.

New Orleans & Northeastern.—At the annual meeting in New Orleans, March 1, the following directors were chosen: J. H. Oglesby, Henry Abraham, Robert Mott, Jules Aldige, Otto Plock, Isaac P. Martin, Frank S. Bond, D. Graff, Charles Schiff. The board elected Frank S. Bond, President; Charles Schiff, Vice-President; Jno. Glynn, Jr., Secretary; F. Hahn, Treasurer.

New York Central & Hudson River.—Mr. W. W. Anstey is appointed Auditor of Disbursements in place of Dewitt Tuthill, deceased. Mr. J. W. Snow succeeds Mr. Anstey as Assistant Auditor and Mr. Charles H. Chambers succeeds Mr. Snow as Register of Disbursements.

New York, Ontario & Western.—The board has elected Francis R. Culbert, J. Coleman Drayton and H. O. North directors in place of John B. Kerr, A. Marcus and E. F. Winslow, resigned.

Northern Central.—At the annual meeting in Baltimore the following officers were chosen: President, George B. Roberts; Vice-President, Frank Thomson; directors, A. J. Cassatt, J. N. DuBarry, Henry Gilbert, John P. Green, J. N. Hutchinson, Henry James, Wistar Morris, B. F. Newcomer, Dell Noblit, George Small, Edmund Smith, B. F. Walters; Secretary, S. W. White; Treasurer, J. S. Leib.

Quincy, Missouri & Pacific.—At the annual meeting in Quincy, Ill., March 2, the following directors were chosen: C. M. Pomroy, James T. Sawyer, John Wheeler, H. F. J. Ricker, Henry Root, Amos Green, Charles W. Keys, W. B. Larkworthy, C. H. Bull.

St. Louis Bridge.—At the annual meeting in St. Louis last week the following directors were chosen: Julius S. Walsh, Gerard B. Allen, Edward Walsh, Jr., Wm. Taussig, J. T. Morgan. The *St. Louis Tunnel Co.* also held a meeting and elected the following directors: Julius S. Walsh, Wm. Taussig, W. S. Humphreys, V. W. Fisher, A. J. Thomas.

St. Louis, Fort Scott & Wichita.—At the annual meeting in Wichita, Kan., last week, the following directors were elected: H. M. Hoxie, A. L. Hopkins, G. C. Smith, D. C. Moran, J. W. Miller, J. H. Dowland, A. W. Walburn, J. H. Richards, N. A. English. The following officers were elected at a subsequent meeting of the board: H. M. Hoxie, President; J. W. Miller, Vice-President; J. H. Dowland, Secretary; and A. H. Calef, Treasurer.

St. Louis Union Depot.—At the annual meeting in St. Louis last week the following directors were chosen: Jay Gould, H. M. Hoxie, James F. How, Wm. Taussig, D. S. H. Smith and A. H. Calef.

Shenandoah Valley.—Sydney F. Tyler, Receiver, announced on Feb. 23 that A. Pope having resigned as General Passenger and Ticket Agent of the Shenandoah Valley Railroad, to accept the position of General Freight Agent of the Norfolk & Western Railroad, O. Howard Royer had been appointed General Passenger and Ticket Agent, taking effect March 1. He will perform the duties of this office in addition to those of General Freight Agent.

Somerset County.—The officers of this company are as follows: M. Schweibin, President; P. H. Schweibin, Treasurer; Frank Schweibin, Secretary; Richard Nevins, Jr., Superintendent and Chief Engineer, Pittsburgh, Pa. General offices, Confluence, Pennsylvania.

Wabash, St. Louis & Pacific.—At the annual meeting in St. Louis, March 9, the following directors (one-third of the board) were chosen: Frederick L. Ames, O. D. Ashley, E. L. Clark, A. L. Hopkins, Russell Sage.

West Shore.—The following order from General Superintendent C. W. Bradley is dated Weehawken, N. J., March 1: "Mr. D. W. Powell, Car Accountant, having been assigned to other duties, the car record office at Weehawken will hereafter be under the charge of Mr. W. G. Wattson, who will act as Car Accountant, in connection with his duties as Chief Clerk in this office."

Mr. R. S. Seibert is appointed Trainmaster and Chief Operator of the Buffalo Division.

PERSONAL.

—Major R. C. Bransford, Secretary and Treasurer of the Nashville, Chattanooga & St. Louis Co., died in Nashville, Tenn., Feb. 15. He had been connected with the road for many years.

—Gen. J. H. Devereux, President of the Cleveland, Columbus, Cincinnati & Indianapolis Co., has been sick at his residence in Cleveland, O., for some days, and his condition is reported to be serious.

—Prof. George L. Vose has resigned his position as Professor of Engineering in the Massachusetts Institute of Technology in Boston, and will close his connection with the Institute at the close of the present academic year.

—Mr. James B. Dayton, who died in Camden, N. J., March 8, aged 64 years, was for a number of years past President of the West Jersey Ferry Co., and a director of the Camden & Atlantic Railroad Co. He was a prominent man locally as a business man and a politician.

—Mr. Marshal L. Hinman, Treasurer of the Brooks Locomotive Works, was last week re-elected Mayor of the city of Dunkirk, N. Y. Mr. Hinman was chosen to that office a year ago, and then announced his intention of conducting the affairs of the city on business principles and without reference to partisan advantage. How successful he has been in carrying out that intention is shown by the fact that at this election he received the very unusual compliment of a unanimous vote from all parties, no candidate having been nominated nor voted for against him.

—Mr. E. O. Hill, who recently resigned his position as Superintendent of the Eastern Division of the New York, Lake Erie & Western road, has been presented with a valuable gold watch and a series of handsomely engrossed and framed resolutions by the officers and employees of his former division. The presentation was made on the evening of March 6, at Mr. Hill's residence in Matamoras, Pa., when a deputation visited him for the purpose. The presentation speech was made by Mr. J. T. Thompson, Agent at Newark.

Mr. Hill was taken completely by surprise and was much affected by the testimonials.

—Mr. De Witt Tutthill, Auditor of Disturbances of the New York Central & Hudson River Co., died at his home in Troy, N. Y., March 4, after an illness of about two weeks. He was born in 1817 at Oxford, Orange County, N. Y., and early taught school at Flushing, L. I. Subsequently he became bookkeeper for Eaton & Co., of Troy, and in 1865 was made Auditor of the New York Central Railroad under President Baxter. He was the first man who held this position, and on the consolidation with the Hudson River Railroad he was retained in the office in New York. He was interested in the National Chain & Cable Co. of Troy, and other industries. He was of extremely methodical habits, and not only was esteemed as a most efficient officer, but gained many friends by his sincerity and loyal disposition. He leaves a wife and one daughter.

—Mr. Caleb B. Meeker died at his residence in Schenectady, N. Y., March 8, after a long illness. Mr. Meeker was not quite 50 years old, having been born in Ballston, N. Y., in 1836. He received a good education, and when 19 years old entered the service of the New York Central Railroad Co. as clerk in the car shops at West Albany, where his uncle, Mr. Noah Vibbard, was then Master Car-Building. He remained in these shops for eight years, and in 1863 was given a position in the general ticket office of the road. In 1865 he was made Assistant General Passenger Agent of the New York Central & Hudson River road, and held that position until 1876, when he was made General Passenger Agent, and continued to hold that office until last year, when failing health compelled him to re-sign. Mr. Meeker's death was caused by paralysis, which first attacked him some two years ago.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Two months to Feb. 28:				
	1886.	1885.	Inc. or Dec.	P. c.
Buff. N. Y. & Phila.	\$379,713	\$342,381	I. \$37,332	10.9
Buff. R. & P.	2,453,900	1,611,528	I. 842,372	52.3
Canadian Pacific	982,000	824,541	I. 157,459	19.2
Chi. & Alton	1,008,635	1,184,157	D. 175,522	17.4
Chi. & Northw.	2,439,000	2,992,483	D. 553,483	22.7
Ch. St. P. & M. & O.	712,100	638,652	I. 73,448	11.5
Ch. & W. Mich.	179,977	140,425	I. 39,552	28.2
C. I., St. L. & C.	385,102	375,988	I. 9,114	2.4
Denver & R. G.	828,242	808,902	I. 19,340	2.4
Det., Lan. & N.	148,727	139,650	I. 9,077	6.5
Ev. & T. Haute.	107,284	97,809	I. 9,475	9.7
Flint & Pere Mar.	309,041	273,614	I. 35,427	12.9
Illinois Central	1,605,098	1,756,969	D. 151,771	8.4
Iowa lines	209,320	204,442	I. 4,878	2.4
Long Island	291,152	287,972	I. 3,180	1.1
Louisv. & Nashv.	2,113,491	2,234,057	D. 120,566	5.7
Mexican Natl.	583,800	601,079	D. 17,279	3.0
Min. & N. W.	192,768	146,388	I. 46,380	31.8
Mobile & Ohio	312,336	306,175	I. 6,161	2.0
N. Y. City & Nor.	73,270	56,216	I. 17,054	30.4
Norfolk & West.	416,174	427,347	D. 11,173	2.6
Oreg. R. & N. Co.	505,475	428,585	I. 76,890	18.0
Peoria, Dec. & E.	115,808	116,807	D. 999	0.9
St. P. & Duluth	156,715	138,188	I. 18,527	13.4
Month of January:				
Chi. Bur. & Q.	\$1,386,721	\$1,992,484	D. \$605,763	30.4
Net earnings	462,317	822,531	D. 360,214	78.1
C. I., St. L. & C.	105,094	203,443	D. 98,349	93.5
Net earnings	78,393	69,347	I. 9,046	11.5
Louisv. & Nashv.	1,050,021	1,170,749	D. 120,728	10.3
Net earnings	371,843	456,980	D. 85,137	23.2
N. Y. Lake Erie & Western	1,254,112	1,050,474	I. 203,638	19.4
Net earnings	342,885	187,127	I. 155,758	83.3
N. Y. P. & O.	408,076	399,091	I. 8,985	2.3
Net earnings	89,907	108,203	D. 18,296	20.6
Ohio & Miss.	274,180	300,300	D. 26,120	8.7
Net earnings	60,850	73,909	D. 13,059	21.3
Rome, W. & O.	124,577	114,377	I. 10,200	8.9
Net earnings	29,993	25,977	I. 4,016	15.4
Union Pacific	1,428,029	1,674,948	D. 246,919	14.7
Net earnings	240,561	561,785	D. 321,224	57.2
Month of February:				
Buff. N. Y. & Phila.	\$170,109	\$149,700	I. \$20,409	13.6
Buff. R. & P.	98,624	73,043	I. 25,581	35.0
Canadian Pac.	465,000	400,577	I. 64,423	16.0
Chi. & Alton	541,304	537,322	I. 3,982	0.7
Chi. & Northw.	1,603,800	1,479,803	I. 123,997	8.4
C. St. P. & M. & O.	385,500	307,200	I. 78,300	25.5
Ch. & W. Mich.	98,143	65,498	I. 32,645	46.8
C. I., St. L. & C.	200,574	172,544	I. 28,030	16.3
Denver & R. G.	423,818	403,561	I. 20,257	4.8
Det., Lan. & N.	82,957	65,710	I. 17,247	26.1
Ev. & T. Haute.	56,104	46,443	I. 9,661	21.0
Flint & Pere Mar.	156,971	129,764	I. 27,207	20.9
Illinois Central	839,398	840,912	D. 1,514	0.2
Iowa lines	121,020	100,839	I. 20,181	19.9
Long Island	138,119	137,538	I. 581	0.4
Louisv. & Nashv.	1,063,471	1,083,308	D. 19,837	1.8
Mexican Natl.	283,400	281,428	I. 1,972	0.7
Min. & N. W.	98,153	73,793	I. 24,370	33.0
Mobile & Ohio	45,333	40,042	I. 5,291	13.2
N. Y. City & Nor.	35,958	27,388	I. 8,570	31.7
Norfolk & West.	197,267	198,092	D. 825	0.4
Oreg. R. & N. Co.	303,000	236,882	I. 66,118	28.1
Peoria, Dec. & E.	61,845	55,532	I. 6,313	11.3
St. P. & Duluth	71,608	56,808	I. 14,800	26.4

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Western Weighing Association.

The number of cars weighed (bound west from Chicago) in February, was:

No. cars.	1886.	1885.	Increase.	P. c.
.....	47,871	34,032	13,839	40.7

This is a very large increase, but the Chicago roads were badly blocked last year. In January of this year the number of cars weighed was 38,169—1,468 per day, against 1,987 in February—January being the snowy month this year.

Indianapolis Percentages.

The following are given as the percentages awarded under the late Indianapolis pool, and the percentages actually carried for about a year before it expired:

	Awarded.	Earned.
Wabash	6.5	5.8
Cleve., Col., Cin. & Ind.	29.0	32.7
Pan-Handle	26.5	17.8
Cin., Ind. & St. L. & Chic.	8.0	5.0
Cin., Hamilton & Ind.	8.0	9.3
Louisville, New Albany & Chicago	3.0	1.6
Ind., Bloomington & Western	19.0	27.8

During a large part of this time rates were so low that it was not worth while to work for traffic, and this is likely to have changed the percentages considerably.

Transcontinental Passenger Rates.

The cutting of transcontinental passenger rates has continued without abatement, and open rates have been made

this week by all the roads at San Francisco of \$20 from that city to Chicago and \$35 to New York, while round trip tickets, with 30 days' limit, were sold at \$62.50 to Chicago and \$92 to New York. The cutting, however, reached its highest point at Los Angeles last week, when limit tickets were sold at \$8 to Chicago and \$20 to New York. Subsequently, however, the rate was raised to \$15 to Chicago and \$28 to New York.

Northwestern Traffic Association.

The earnings of the lines in the Northwestern Traffic Association during the months of December and January were as follows:

	West-bound.	East-bound.	Wheat milled locally.
Chi., Mil. & St. P.	\$74,106	\$19,313	\$12,142
Chi. & Northw.	64,540	.....	.....
Chi., Rock Id. & P.	50,934	.....	.....
Chi. Bur. & Q.	21,550	.....	.....
Chi. St. P. M. & O.	.....	22,353	33,270
Min. & St. L.	.....	25,003	2,752
Total	\$220,130	\$67,269	\$50,164

The St. Paul road was over its allotment except in wheat milled at local points, where it fell far below, and the Omaha had much above its proportion.

Cotton.

Cotton movement for the week ending March 5 is reported as follows, in bales:

	1886.	1885.	Inc. or Dec.	P. c.
Receipts	43,148	30,150	I. 12,998	43.2
Shipments	43,346	47,450	D. 4,113	8.7
Stock, March 5	442,408	199,179	I. 243,229	121.0
Receipts	68,223	56,806	I. 11,417	19.9
Exports	82,004	61,808	I. 20,196	32.5
Stock, March 5	985,917	709,649	I. 276,268	28.0

The total movement from plantations for the crop year to March 5 is estimated at 5,855,994 bales, against 5,310,646 last year, 5,229,715 in 1883-84, and 6,041,232 bales in 1882-83.

The *Commercial and Financial Chronicle* says: "As it will interest the reader to see what has come into sight each month of the season during this and previous years, we have prepared the following, which shows the movement for the last four seasons:

Months.	1885-86.	1884-85.	1883-84.	1882-83.
September	485,552	413,836	450,047	402,336
October	1,360,870	1,309,111	1,325,716	1,180,761
November	1,443,433	1,390,902	1,317,773	1,402,952
December	1,488,582	1,360,404	1,264,816	1,435,606
January	541,793	513,187	453,985	803,565
February	470,591	291,753	370,337	604,853
Total 6 months.	5,799,821	5,279,193	5,182,674	5,889,454

"The movement up to March 1 shows an increase in the average weight as compared with the same period of the last two years, the average this year being 488.17 lbs. per bale, against 480.68 lbs. per bale for the same time in 1884-85 and 482.38 lbs. per bale in 1883-84."

Coal.

Anthracite coal tonnage, as given by the weekly statements of the companies, has been as follows for the two months to Feb. 27 for eight years past:

	1886.	1885.	Inc. or Dec.	P. c.
1886	4,840,538	4,138,836	I. 701,702	16.9
1885	3,272,747	1,881,000	I. 1,391,747	74.0
1884	3,098,333	1,880,000	I. 1,218,333	64.8
1883	3,060,463	1,879,000	I. 1,181,463	63.0

The tonnage of this year is unprecedented. The very large output is, apparently, to continue, as no movement has been so far made toward a restriction. Prices continue very low. Bituminous coal tonnages for the two months to Feb. 27 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Cumberland, all lines	303,619	298,233	I. 5,386	1.8
Huntingdon & Broad Top	47,183	24,084	I. 23,099	96.2
Barclay R. R. & Coal Co.	34,362	44,754	D. 10,392	23.1
Beach Creek, Cl. & S. W.	154,078	90,171	I. 63,907	71.0
Pennsylvania R. R.	441,810	491,501	D. 49,691	10.1
Mountain District	107,555	80,877	I. 26,678	32.9
Penn. and Westmoreland	232,504	182,917	I. 49,587	27.1
Minor districts	161,043	177,815	D. 16,772	9.4
Norfolk & Western	113,894	77,210	I. 36,684	47.6
Total	1,596,138	1,437,562	I. 158,576	11.0

Bituminous shipments for the present will probably be lessened, owing to the miners' strike in Pennsylvania. The Clearfield miners have resumed work, pending an arbitration.

Coke tonnages for the two months to Feb. 27 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Southwest Penna. R. R.	203,918	268,240	D. 64,322	29.1
Other districts, Pa. R. R.	122,600	90,558	I. 32,042	35.5
Connellsville, via Pa. R. R.	7,485	18,529	D. 11,044	59.7
Total coke	334,003	397,327	D. 63,324	19.0

Coke shipments have been seriously interfered with by the labor troubles in the Connellsville Region. These troubles are now nearly adjusted, however, and an increase in shipments may be expected shortly, as coke is in demand, and the supply has been short.

Actual tonnage passing over the Pennsylvania & New York road for the three months of its fiscal year from Dec. 1 to Feb. 27 was:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite	387,643	254,998	I. 132,645	52.0
Bituminous	43,319	80,654	D. 37,335	46.1
Total	430,962	335,652	I. 95,310	28.4

The larger part of the anthracite comes from the Lehigh Valley road, of which this line is an extension.

The *Coal Trade Journal* gives the production of coal in Washington Territory in 1885 at 410,687 tons. The largest output was from the Carbon Hill mines, 198,063 tons; the next from the New Castle mines, 122,062 tons.

Actual tonnage passing over the Huntington & Broad Top Mountain road for the two months to Feb. 27 was:

	1886.	1885.	Increase.	P. c.
Broad Top coal	47,183	24,084	I. 23,099	96.2
Cumberland coal	58,013	27,760	I. 30,253	108.0
Total	105,196	51,844	I. 53,352	102.8

The Broad Top coal is mined on the line; the Cumberland is carried through for the Pennsylvania Railroad.

Cumberland coal shipments for the week ending March 6 were 44,257 tons. Total to March 6 this year, 359,647; last year, 306,862; increase, 52,785 tons, or 17.2 per cent. The miners in this region have this week joined in the general strike for higher wages.

Transcontinental Freight Rates.

At a meeting held in Chicago, March 8, representatives of all the roads concerned were present and agreed to make present rates from Chicago to Pacific coast points 40 cents per 100 lbs. for carload lots, and 50 cents for smaller lots on all classes

of freight. The meeting was not a formal one, but the agreement was generally joined in. It is since stated, however, that the Union Pacific has taken freight at 30 cents.

Boston Traffic Notes.

The total number of cars passing through the Hoosac Tunnel in January was 27,133, against 28,676 last year and 24,207 in 1884.

Colorado-Utah Association.

The earnings of the lines in the Colorado-Utah Association for the month of January were as follows:

Roads.	West-bound.	East-bound.	Totals.
C. & A.	\$6,076	\$2,294	\$8,370
C. B. & Q.	13,723	7,837	21,562
C. M. & St. P.	2,046	789	2,835
C. & N. W.	6,129	462	6,591
C. R. I. & P.	13,038	421	13,459
M. P.	2,048	191	2,239
W., St. L. & P.	5,311	559	5,870
Totals	\$48,372	\$12,554	\$60,926

The Alton, the Burlington and the Rock Island were over in their proportions, the other lines short.

RAILROAD LAW.

Injury to Employee—Liability for Foreign Cars.

In the case of Gottlieb against the New York, Lake Erie & Western Co., plaintiff, a brakeman brought suit to recover damages for injuries received by being crushed between two cars which he was trying to couple. The defense claimed that the cars belonged to other companies, and that the defendant was not responsible for their defects. The New York Court of Appeals held as follows:

1. A railroad company is bound to inspect foreign cars which it draws over its road, just as it would inspect its own cars, and is responsible to its employees for the consequence of such defect in such cars as would be disclosed or discovered by ordinary inspection.

2. The employee takes no more risks of defects in foreign cars than in cars belonging to the company; and where a brakeman was injured while coupling cars by reason of the bumper being so defective that it could have been seen on ordinary inspection, the company is liable.

OLD AND NEW ROADS.

Chicago & Atlantic.—Argument is in progress this week before Justice Gresham in the United States Circuit Court in Chicago on the petition of the Farmers' Loan & Trust Co. for the appointment of a receiver, pending the suit for foreclosure of mortgages. The application is opposed by the company, whose counsel claim that it is not insolvent and seeks to show that it would be able to meet all its liabilities, provided the company could obtain a settlement of its differences with the Erie. A large number of affidavits were presented on both sides and a number of counsel representing the Farmers' Loan & Trust Co., the Chicago & Atlantic Co., the Erie and the bondholders, are to be heard.

On March 9, Judge Gresham decided to take the case under advisement, allowing counsel to file briefs with him. He incidentally remarked that he was not in favor of a receivership unless a strong case was made, and intimated that in his opinion the courts have been too liberal in this respect. He did not state when he would come to a decision, but he further intimated that, if the interests of the bondholders are to be regarded, the road should be run in connection with the Erie.

Chicago, Burlington & Quincy.—This company's statement for January is as follows:

	1886.	1885.	Decrease.	P. c.
Earnings.....	\$1,386,721	\$1,992,484	\$605,763	30.4
Expenses.....	984,404	1,129,954	145,550	12.9
Net earnings.....	\$402,317	\$862,530	\$460,213	53.3

The great reduction in earnings was due chiefly to the bad weather and snow blockades of the month, causing serious interruption to traffic.

Chicago, Milwaukee & St. Paul.—A dispatch from Milwaukee, March 6, says: "Manager Roswell Miller to-day said that the directors of the St. Paul road had decided on several other extensions beside the one to Kansas City. One extension, the contract for which has already been let, is from Andover, on the Hastings & Dakota Division, to a point 55 miles north, which will tap one of the finest wheat belts in the Territory. Work has already been commenced. Another line which will be built as soon as the weather will permit is from Scotland to Mitchell, in Dakota, a distance of 47 miles. The building of one line that will affect the people of Central Dakota very materially is the extension of the Hastings & Dakota Division for a distance of 30 miles. Ipswich is the present terminus, and the road will run directly west on a survey made by Engineer Baker three years ago. At that time a town was started 16 miles west of Ipswich on the survey, called Roscoe. The town has been built up rapidly, is situated on a prominence in the midst of a fertile valley, and Manager Miller said to-day that Roscoe would be one of the three stations on that line. The country is settled up by farmers from Ipswich to the Missouri River, which insures plenty of business for the new line. In regard to the building of the road to the Missouri River, Mr. Miller said that although the road would probably finally reach there, the matter had not been discussed by the directors."

Cincinnati, Indianapolis, St. Louis & Chicago.—The statement for January is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$195,994	\$203,443	D. \$7,449	3.4
Expenses.....	117,601	134,096	D. 16,495	12.3
Net earnings.....	\$78,393	\$69,347	I. \$9,046	13.1
Fixed charges.....	50,000	50,000	.....	.....
Surplus.....	\$28,393	\$19,347	I. \$9,046	47.6
Surplus July 1-Dec. 31.	188,674	211,301	D. 22,627	10.7
Total surplus, 7 mos.	\$217,067	\$239,648	D. \$12,581	5.9

Earnings were reduced by bad weather in January. The surplus for the seven months this year is equivalent to 3.1 per cent. on the stock.

Cleveland & Canton.—The annual report of this company submits a plan prepared by the directors for the purpose of providing for the change of gauge of the road from 3 ft. to standard and for other necessary improvements. Under this plan it is intended to consolidate the Cleveland & Canton Co. with the Coshocton & Southern, the name of the consolidated company to be the Cleveland, Canton & Southern. The new company, if the plan should be carried out, will have \$8,000,000 first preferred stock, \$6,000,000 second preferred stock, and \$4,000,000 in common stock. The company will have no bonded debt, and the only floating debt now existing is \$75,000 in receivers' certificates and \$72,000 in notes of the company. It is proposed that the preferred stock of the present company, which represents the old bonds, may be converted into the second preferred stock of the new company without cost, or into first preferred on payment of \$30 per share, while the common stock may be converted into new common stock without cost, or into first preferred on payment of \$50 per share. The amount raised from first preferred stock will, it is expected, be able to pay off the floating debt and make the change of gauge, and will also enable the company to complete the purchase of the terminal property in Cleveland. The total cost of all these improvements is estimated at \$1,800,000.

This plan is not favored by the parties who opposed the election of the present management, who object to the very large amount of securities which the company proposes to issue, the first preferred stock being about \$50,000 the second preferred stock, \$37,500, and the common stock, \$25,000 a mile. What this party proposes doing has not yet been announced, but they are making an active canvas for proxies at the approaching annual meeting, with the avowed intention of turning out the present management, and it is stated that they have secured the backing of Mr. Austin Corbin, who has acquired some interest in the property.

Mr. Corbin's proposal made to the company is to the effect that he will place an issue of \$1,000,000 in 5 per cent. bonds, the amount realized being sufficient, according to his estimate, to change the gauge of the road and to complete the purchase of the terminal property. He also offers to make an agreement for the exchange of traffic with the Indiana, Bloomington & Western, which will, he thinks, be of great benefit to the line.

The opposition to the present management, who favor Mr. Corbin's proposal, claim that they have already received proxies for a majority of the stock, and that they will be able accordingly to elect their own candidate at the approaching annual meeting.

Columbus, Hocking Valley & Toledo.—The report which has been current for a few days past that this road was to be sold or leased to the Cleveland, Columbus, Cincinnati & Indianapolis Co. is denied by authority.

Dakota Midland.—This company is now making arrangements for a reorganization, which will, it is expected, secure sufficient capital to complete the Eastern Division of the line from Campbell, Minn., into Dakota. The headquarters of the company have been removed from Ellendale to Fargo, Dak.

Duluth, Huron & Denver.—This company has been organized to build a railroad from Duluth, Minn., to Huron, Dak., with a possible extension to Denver, Col. The company expects first to build the section from Huron eastward to Willmar, Minn. The surveys are to be made at once.

Elizabethtown, Lexington & Big Sandy.—The statement of this company for the year ending Dec. 31 compares as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Gross earnings.....	\$706,943	\$762,628	D. \$55,685	7.3
Operating expenses.....	433,694	504,575	D. 70,881	14.0
Net.....	\$273,249	\$258,053	I. \$15,196	5.9
Interest, rentals and taxes.....	248,165	224,717	I. 23,448	10.4
Surplus.....	\$25,084	\$33,336	D. \$8,252	25.0

The road is the western extension of the Chesapeake & Ohio, and is operated by that company, but its accounts are kept separately.

Evansville & Terre Haute.—The report that the Louisville & Nashville stock had been sold to Chicago & Eastern Illinois people is contradicted. The Louisville & Nashville stock was sold in the open market, and was bought by various parties. It is stated that so far from the purchase being made by the Chicago & Eastern Illinois, the fact is that the company has sold a considerable portion of the Evansville & Terre Haute stock which it bought at the same time the purchase was made by the Louisville & Nashville.

Gulf, Colorado & Santa Fe.—A Boston rumor to the effect that the Texas owners of this road are considering a proposition for the sale of a controlling interest to the Atchison, Topeka & Santa Fe is denied. The present owners state that they have no wish to sell, but expect to retain themselves the control of their road. It is probable that the two roads will be connected by a line through the Indian Territory, both companies having received authority from Congress to build such a line, but there have been no negotiations so far with respect to its construction and no action has yet been taken as to the connection, although it is very likely that some agreement will be made before it is built.

Indianapolis Union.—This company, which owns the Union Depot and track in Indianapolis, has decided to build a new union passenger station in that city, and for that purpose has placed an issue of \$500,000 in 4½ per cent. bonds. The new station will require the purchase of considerable additional property, but the directors have not finally agreed upon the site to be chosen, and the plans for the station will not be made until that point is settled.

Lake Shore & Michigan Southern.—This company is having a survey made for a branch from Coalburg, O., to Sharon, a distance of 7 miles. It is understood that the branch will be continued from Sharon to Sharpsburg and West Middlesex, the object being to reach a number of blast furnaces in the Shenango Valley.

Little Rock & St. Louis.—This company has filed articles of incorporation to build a railroad from Little Rock, Ark., to some point on the Texas & St. Louis road. The incorporators are chiefly citizens of Little Rock.

Louisville & Nashville.—The statement for January and the seven months of the fiscal year from July 1 to Jan. 31 is as follows:

	1886.	1885.	Seven months.	1886-85.
Earnings.....	\$1,050,021	\$1,170,749	\$7,886,490	\$8,270,989
Expenses.....	678,178	713,769	4,825,129	4,701,833
Net earnings.....	\$371,843	\$456,980	\$3,061,373	\$3,575,136

For the seven months this year the gross earnings decreased \$900,470, or 4.7 per cent., and the expenses increased \$123,293, or 2.6 per cent., the result being a decrease of \$513,763 or 14.4 per cent., in net earnings.

Expenditures for new construction and equipment for the seven months this year were \$161,811; deducted from net earnings this leaves \$2,900,062 net balance.

Louisville, New Albany & Chicago.—At the annual meeting in New York, March 10, the following statement was made: "The year's business showed an encouraging increase in earnings and a marked diminution in the ratio of operating expenses, which had been reduced to more than 20 per cent. less than the rate at this time last year. During the year the physical condition of the property has been much improved, and the road has been lengthened by the purchase of 42 miles from Bedford to Switz City, giving entire control of the Bedford stone traffic. The satisfactory financial condition of the company has enabled it to pay off all the floating debt. The bonds heretofore authorized in 1884 for \$3,000,000 have all been called in and canceled, and the company now places upon the market a new consolidated bond, of which the greater part has been reserved for extinguishing the old mortgages and a small amount has been recently sold to further improve the condition of the road and its rolling stock. The equipment of the road is now in an efficient condition."

Memphis & Charleston.—This company, it is stated, has sold \$1,000,000 of its new 6 per cent. general mortgage bonds in a single block to Charles M. Whitney & Co., the proceeds to be applied to funding the floating debt and for the purchase of steel rails and additional equipment.

Mexican National.—It is announced that holders of this company's securities will shortly be asked to subscribe to a new loan for \$6,000,000 for the purpose of completing the road.

Milwaukee, Dexterville & Northern.—Arrangements have been made to begin work on this road from Dexterville, Wis., towards Neillsville.

Missouri Pacific.—The strike of the freight brakemen and other employees of the company, which began last week, has extended over the whole system operated by the company, and has practically put a stop to all freight traffic, although passenger trains are still run. The locomotive engineers and firemen have not so far taken any part in the strike, but are, of course, unable to do anything in opposition to the other employees. The strike was ordered by the Knights of Labor, a large majority of the men on the road belonging to that organization, and is based on a claim that the company has violated the agreement made with the men at the time of the strike a year ago. The company has so far taken no active measures toward resuming traffic and reopening the road, but its officers seem to be merely waiting to see what will be done by the men. The origin of the strike was on the Texas & Pacific, and it commenced on the refusal of the officers of that road to reinstate a foreman in the Marshall shops who, it was claimed, had been discharged in violation of agreement. It was at first confined to that line alone, but was extended to the other lines in the system by the refusal of the men to handle freight to and from the Texas & Pacific line, and in a very short time resulted in the present complete stoppage of business.

On March 9 the officers of the company made a new move by discharging or temporarily laying off a large number of employees, including clerks, telegraph operators and others who were not engaged in the strike, but were unable to work during its continuance. The men laid off included locomotive engineers and firemen employed on freight trains, although it is reported that the company has agreed to pay these men half wages during their enforced idleness. The company also gave notice that all men who have left its service were discharged.

New York, Chicago & St. Louis.—In the Court at Cleveland, O., March 5, the Lake Shore & Michigan Southern Co., filed a claim of \$370,611 against this road, and asked for an order directing the receiver to pay the amount. The claim is for the use of terminal facilities in Buffalo and Chicago, and for expenses of handling freight at those points.

New York, Lake Erie & Western.—This company's statement for January and the four months of the fiscal year from Oct. 1 to Jan. 31 is as follows, the figures including 68 per cent. of the gross earnings and all the working expenses of the leased New York, Pennsylvania & Ohio road:

	1886.	1885.	Four months.	1886-85.
Earnings.....	\$1,331,604	\$1,315,443	\$7,397,665	\$6,457,024
Expenses.....	1,229,296	1,144,805	5,195,614	4,820,375

Net earnings..... \$302,308 \$170,638 \$2,102,051 \$1,636,649

For the four months the gross earnings increased \$840,641, or 13.0 per cent., and the expenses \$875,259, or 7.8 per cent., leaving a gain of \$465,402, or 28.4 per cent., in net earnings.

The earnings of the Erie lines proper, excluding all earnings and expenses of the New York, Pennsylvania & Ohio, were:

	1886.	1885.	Four months.	1886-85.
Earnings.....	\$1,254,112	\$1,050,474	\$5,954,426	\$5,195,871
Expenses.....	911,127	863,347	3,854,604	3,642,831

Net earnings..... \$342,985 \$187,127 \$2,099,822 \$1,553,040

For the four months the gross earnings increased \$758,555, or 14.6 per cent., and the expenses \$211,773, or 5.8 per cent., leaving a gain of \$546,782, or 35.2 per cent., in net earnings.

A comparison of the statements shows that for the four months this year the 68 per cent. of the gross earnings of the leased road amounted to \$1,343,238, and its working expenses to \$1,341,009, leaving a profit of \$2,229 on the lease, against a similar profit of \$83,609 for the corresponding period last year.

Northern Pacific.—This company has won an important land suit, which will place in the treasury a large sum of money. In 1875 a dispute arose between the Northern Pacific and the Manitoba Co. as to the title of about 600,000 acres of land at a point where the two roads cross each other, and a suit was begun in the courts. By an agreement the land was put in possession of a trustee, who was authorized to sell it and deposit the money for the benefit of the party winning the suit. The fund arising from the sale of land amounted to \$600,000, which is invested in government bonds, and there is about the same sum due from settlers. Besides this there are some 200,000 acres unsold, which are estimated to be worth \$10 per acre. The Court has decided that the Northern Pacific Co. is entitled to the land. The case may be appealed.

The Seattle (Wash. Ter.) *Intelligencer* says: "Mr. Nelson Bennett, contractor for the completion of the Cascade Division, is already working a force of 125 men at both portals of the tunnel. The road will be built this year from Ellensburg to the eastern portal, but the completion of the 27 miles of uncompleted road between the western portal and the Sound will not be completed for a year or more. Nor will the switch-back be built. The first transcontinental trains from St. Paul over the Cascade Division to Puget Sound will run through the Cascade Mountains and not over the Ohio."

Ohio & Mississippi.—This company's statement for January is as follows:

	1886.	1885.	Decrease.	P. c.
Earnings.....	\$274,180	\$300,300	\$26,120	8.7
Expenses.....	213,330	226,391	13,061	5.8
Net earnings.....	\$60,850	\$73,909	\$13,059	17.6

The company continues to show a considerable decrease in expenses, which was not large enough, however, to meet the decrease in gross earnings due largely to unfavorable weather.

Pennsylvania.—The Philadelphia *Ledger* of March 8 says: "The Pennsylvania Railroad Co., we are informed, contemplates issuing an additional amount of car trust certificates. The interest rate of the new issues will probably be at 4 per cent., the management of the company believing that in the present easy condition of the money market they will be eagerly sought by investors, although heretofore the lowest car trust interest rate has been 5 per cent."

The annual meeting was held in Philadelphia, March 9, with the usual large attendance. The meeting was largely by two or three dissatisfied stockholders, who varied the reading of the annual report by a number of questions, addressed to the President, and who offered a number of resolutions in relation to the express traffic, sleeping car traffic and other matters. Such of these resolutions as were seconded were all voted down. A resolution was adopted approving the suggestion of the directors made in the report and authorizing them to issue \$300,000 additional shares of stock, from time to time, as they may be needed. The meeting adjourned after passing the usual resolution appointing a committee of 7 to nominate directors to be voted for at the annual election.

Philadelphia & Reading.—The Receivers' report of receipts and disbursements for January is as follows:

	Railroad Co.	Coal & Iron Co.
Balance, Jan. 1.....	\$248,150	\$2,338
Receipts for the month.....	2,193,268	1,198,025
Total.....	\$2,441,418	\$1,200,363
Disbursements.....	2,098,237	1,184,214

Balance, Feb. 1..... \$343,181 \$16,149

This statement does not show the earnings and expenses, but the actual cash receipts and payments during the month.

The syndicate has published the following statement, which is signed by Messrs. John C. Bullitt, J. Pierpont Morgan and J. Lowber Welsh:

"In view of the misrepresentations publicly made respecting the present condition of the syndicate formed for assisting the reorganization of Reading Railroad and coal properties, we wish to make the following official statement: "1. Neither Mr. Corbin nor Mr. Gowen was ever applied to, directly or indirectly, by any one having any authority from us or any member of the syndicate, either to join in the syndicate, to assist it, or to approve its measures or objects."

"2. No change will be made in the policy of the syndicate, owing to Mr. Corbin having become one of its members. The syndicate adheres to its original plan, and that, as stated in the original letter of the Reading Reorganization Trustees, viz.: To secure the reorganization on business principles for the Reading Railroad bondholders, stockholders and creditors, without prejudice to the relative position of either, and in their interest only in harmony with the other coal properties and the trunk line situation."

"3. We believe that in Mr. Corbin and his friends we have influential and powerful allies, who, having joined the syndicate, will do everything in their power to assist us in carrying out the reorganization based on the policy set forth in our letter of Feb. 11, addressed to John B. Garrett, Chairman, to which all members of the syndicate are pledged."

In answer to the card of the syndicate President Gowen

has written a long letter, in which he claims that in 1885 the company's property earned at least 4 per cent. on all its stock and debts, and that the average earnings of the last five years have been equal to 5 per cent. on the entire stock and debt, an assertion he will find it pretty difficult to prove from the figures published by the Receivers. Mr. Gowen also claims that at a reasonable price the coal lands owned by the company would pay the entire debt, leaving the railroad property to represent the stock and deferred income bonds. He claims that a reorganization can be made without foreclosure or assessment, providing for all interests in due order of priority. Mr. Gowen further says that the managers of the company are delaying action in order to await the final action of the reorganization trustees, and that they will approve the trustees' plan if unobjectionable in its essential features. Should this plan finally prove objectionable or should its publication be delayed so long as to prevent the company from exercising the option of retiring the general mortgage during the present year the managers will present a plan of their own.

Portland & Ogdensburg.—The Receiver reports that the gross earnings of this road for the quarter ending Dec. 31 were \$38,989. The expenses were \$18,763, leaving \$20,226 as net earnings. The Receiver states his total cash receipts for the quarter, including a balance of \$33,205 from the preceding quarter, at \$340,419. Payments were \$322,405, leaving a balance of \$18,014 on hand. The total amount of receiver's certificates sold has been \$250,000. The amount expended during the receivership on improvements of the road has been \$350,553, the balance over the amount received for certificates having been supplied by the net earnings of the road.

Quincy, Missouri & Pacific.—The United States Circuit Court has granted a final decree of foreclosure and sale against this road, and has appointed a Master to make the sale after the necessary advertising. The road extends from Quincy, Ill., to Trenton, Mo., 136 miles, and was formerly part of the Wabash system.

Rome, Watertown & Ogdensburg.—This company's statement for January and the four months of the fiscal year from Oct. 1 to Jan. 31 is as follows:

	January.	1885.	Four months.	1884-85.
Earnings.....	\$124,577	\$114,937	\$630,375	\$586,256
Expenses.....	91,534	88,960	404,561	382,410
Net earnings....	\$29,993	\$25,977	\$225,814	\$203,846

For the four months the gross earnings increased \$44,119, or 7.5 per cent., and the expenses \$22,151, or 5.8 per cent., leaving a gain of \$21,968, or 10.8 per cent., in net earnings.

St. Louis & San Francisco.—This company is now offering, through Dwight Braman, of Boston, \$756,000 first mortgage 6 per cent. bonds of the Kansas City & Southwestern road. This road, which was recently completed, is 63 miles long, and it is leased by the St. Louis & San Francisco Co., which also owns all the stock and guarantees the bonds.

Scioto Valley.—The Receiver reports that for the six months from July 1 to Dec. 31 last the receipts of the road were \$301,980; the expenses \$256,556, and the net earnings \$45,424. In expenses are included \$38,607 paid for steel rails and new iron bridges.

Silver Lake.—The Rochester (N. Y.) *Democrat and Chronicle* says: "The Silver Lake Railroad, a road about 6 miles long, running from Silver Springs, on the Buffalo, Rochester & Pittsburgh and the Erie roads, to Perry, was sold Wednesday to John J. Carter, President of the Bradford, Bordell & Kinzua Co. for \$125,000. The road was built by the town of Perry about 15 years ago, and two years ago the town put the road in charge of three commissioners, with instructions to sell it whenever a fair price could be obtained. The road was used as a stub line to Perry by the Buffalo, Rochester & Pittsburgh and the Erie roads, and is said to have been profitable property, paying as high as 12 per cent. some years. It is rumored that the road was bought in the interest of the Erie, but this is denied at Perry."

Somerset County.—This road connects with the Baltimore & Ohio Railroad at Draketown Junction, Somerset County, Pa., and extends from that point to Schweibenzville, a distance of 10 miles. It is now in course of construction between Schweibenzville and Somerset.

South Atlantic & Ohio.—This road as originally projected was to have been of 3 ft. gauge, and some work on the line was done on that basis. In October last a contract was let to the Bailey Construction Co. to build the road of standard gauge. The company has now been at work for some time dressing up the old grading, widening the embankment and cuts and in extending the grade, and the road-bed is now ready for the track from Bristol, Va., to Mendota, a distance of 15 miles. It is expected that track will be laid on this section by June next, and to Estillville in Scott County in December, and that it will be pushed on to Big Stone Gap. The masonry is all finished to the Clinch River, 40 miles, and ties and timber for trestle work are all under contract to the same point. The whole length of the line from Bristol to Big Stone Gap will be 77 miles, and there will be several short branches leading to coal and iron mines. The road will open up the extensive district now shut in between the Clinch and Cumberland mountains, including 7 counties with a considerable population. It is a rough mountainous region, but contains many fertile valleys which produce excellent crops. Most of the country is heavily timbered, the forest including much valuable hard wood, and it is also known to be rich in minerals, including coal, iron ore, marble and other building stone, but is practically shut out from all railroad communication.

Spokane Falls & Palouse.—A company has been organized to build a railroad from Marshall, Wash., on the Northern Pacific, southward to Palouse, a distance of 46 miles. Arrangements have been made to use the Northern Pacific track from Marshall to Spokane Falls, a distance of 9 miles.

Staten Island Rapid Transit.—This company has completed and opened for traffic a section of its line 4½ miles long, extending from Elm Park, around the west shore of Staten Island, to Clifton, where connection is made with the old Staten Island Railroad, now controlled by this company. In connection with the opening of this section of the line an important change has been made in the running of the ferry-boats between New York and Staten Island. Heretofore there have been two lines of boats; one running to the landing of the south side of the island, and the other to those on the north side. Hereafter but a single line of boats will be run from New York to St. George landing, which is the point on the island nearest the city, and these boats will there connect with the trains of the Rapid Transit road, passengers thus reaching their respective stations in quicker time than heretofore by boats, although a change from car to boat is involved. The company will thus be able to conduct a better ferry service with fewer boats.

State Line & Stony Point.—This company has filed articles of incorporation in Albany for the purpose of building a railroad from the New Jersey state line, near Pier

mont, N. Y., along the shore of the Hudson River, to Nyac, and thence around the foot of the Hook Mountain to Haverstraw, and through that village to a connection with the West Shore road at Stony Point. The distance is about 18 miles, and the proposed line follows very closely the first line surveyed for the West Shore road some 20 years ago.

Texas & Pacific.—It is reported that a number of large holders of the income and land grant bonds are having selections of land made from the company's grants, which they will pay for in scrip. They are taking this action, it is said, in the belief that they will thus secure themselves and obtain the only value for their bonds which they are now likely to get.

A meeting of bondholders was held in Philadelphia, March 5, which was largely attended. A resolution was passed approving the action of the directors of the company in refusing to recommend an issue of receiver's certificates. Another resolution was passed approving the action of the board in appointing a committee to prepare a plan of reorganization, and also approving of the constitution of the committee.

Union Pacific.—The statement of this company for January compares as follows with last year:

	1885.	1884.	Inc or Dec.	P. c.
Gross.....	\$1,428,029	\$1,074,948	D. \$246,919	14.7
Expenses.....	1,187,408	1,113,163	I. 74,305	6.7
Surplus.....	\$240,561	\$561,785	D. \$321,224	57.2
Taxes.....	83,285	75,394	I. 7,891	10.5
Net earnings.....	\$157,276	\$486,391	D. \$329,115	67.7

The decrease in gross earnings and the heavy loss in net earnings this year are chiefly due to the bad weather and snow blockades along the lines.

Wabash, St. Louis & Pacific.—The Receivers have filed a statement with the Court of the business from Dec. 1, 1885, to March 1, 1886, which is in brief as follows: Receipts, \$4,749,205; operating expenses, \$1,816,843; rentals, \$86,794; supplies and materials, \$781,459; interest on Omaha Div. bonds, \$689,512; miscellaneous, \$1,447,482; total, \$4,822,030; balance on hand, \$89,787.

West Shore.—Drexel, Morgan & Co. give notice that on March 15 they will begin to distribute in exchange for their certificates the new first mortgage bonds of this company. The coupon bonds will be for \$1000 each, the registered bonds in denominations of \$500, \$1000, \$10,000 and \$50,000.

Western Union Telegraph.—The following are the important parts of the report for the quarter ending March 31:

The net revenue of the quarter ending March 31, based upon nearly completed returns for January, partial returns for February and estimating the business for March, will be about.....	\$1,050,000
Add surplus Jan. 1.....	4,102,170
Interest on bonded debt.....	\$123,500
Sinking funds.....	19,991
Leaves a balance of.....	\$5,008,689

"The falling off in the net revenues for the last quarter was in the cable, commercial news and quotation service. There was a large increase of expenses for taxes and cable and land line repairs, which are beyond control. The receipts for regular inland commercial messages have been well maintained, the weekly receipts therefor at test offices (which include those at all the principal business cities and towns, and all the important points reached by competing lines) showing an increase of \$31,176 over those of the corresponding quarter of the previous year.

"The winter has been a very hard one on telegraph lines, occasioning unusual expense for maintenance, and many and protracted interruptions of wires for handling business. Notwithstanding such frequent interruptions by storms and floods, the 10 weeks of the present quarter since January 1 show receipts for inland commercial business of the test offices equal to those of the corresponding weeks of last year, while our cable business is recovering from its depression. The volume of inland commercial messages handled is greatly in excess of the previous year.

"Of the surplus at the close of this quarter of \$5,008,689, as shown in the statement, there have been invested in the construction and purchase of lines and other telegraph properties up to the beginning of the quarter \$4,388,986, which will probably be shown to have reached \$4,500,000 by the close of the quarter, with a probability of requiring further investment of considerable sums at an early date.

"It is therefore recommended to pay no cash dividend. But the surplus invested in the plant may be capitalized by the issue of additional capital stock, and distributed *pro rata* to the stockholders to whom it belongs, which has been held by the Court of Appeals to be a legal and proper method of representing it."

On this showing it was resolved to make the quarterly dividend 1½ per cent., payable in scrip convertible into new stock of the company.

Wheeling & Lake Erie.—A Toledo dispatch reports that the holders of floating debt claims against this company, which are likely to be cut off by the coming foreclosure, are considering the question of bringing suit against the stockholders individually, claiming that under the Ohio law they will be liable for the floating debt of the company. It is said that a concerted arrangement will be made by which a large number of suits will be brought simultaneously against the stockholders, and the legal question involved will be decided.

Wisconsin Central.—The tracklayers at the northern end of the Chicago extension have reached the crossing of the Chicago & Northwestern road, 9 miles south of the late terminus at Burlington, Wis., and 64 miles from Schleisingerville. Work is now being pushed southward rapidly. The tracklayers working north from Chicago have reached the county line, a distance of 26 miles from the starting point, and tracklaying there has been suspended for the present.

The Chicago *Times* says: "The negotiations that have been pending for the past four months for the sale by the Rock Island to the Wisconsin Central of a triangular strip of ground just south of Taylor street and bordering the river have closed. The plat contains about 29,000 square feet, and its acquisition rounds out the plan of the Wisconsin Central to cross the river at that point on its way to the Harrison street station. There is nothing now in its path, with the exception of the Bridewell lot, the land having been acquired from Sixteenth street north to Polk street. The Central paid a good round price for the particular piece of ground mentioned, the amount not being given, as it might prejudice other pending negotiations."

ANNUAL REPORTS.

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Worcester, Nashua & Rochester.

This company owns a line from Worcester, Mass., to Rochester, N. H., 94.48 miles. There are 18.13 miles of second track and 20.10 miles of sidings. The report is for the year ending Sept. 30.

A lease of the road to the Boston & Maine Co. has been agreed on, but has not yet gone into effect.

The equipment includes 24 locomotives; 19 passenger, 3 parlor and 8 baggage cars; 163 box, 130 flat and 100 coal cars; 1 derrick and 2 tool cars and 4 snow-plows.

The general account condensed, is as follows:

Stock.....	\$3,099,800
Bonds.....	1,092,000
Notes payable, interest, etc.....	143,005
Profit and loss.....	90,236
Total.....	\$4,995,041
Road and equipment.....	\$4,553,921
Wor. Nash. & Roch. stock.....	288,300
Materials.....	80,844
Accounts receivable.....	16,817
Cash.....	55,159
Total.....	4,995,041

Since the close of the year 2,531 shares of the stock held have been distributed to stockholders as a dividend. The bonds are plain 5s, maturing at various dates from 1887 to 1895.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Passenger dep't.....	\$215,656	\$226,084	D. \$10,428	4.5
Freight dep't.....	408,310	404,865	I. 3,451	0.8
Rents.....	9,102	8,498	I. 604	7.1
Total.....	\$633,074	\$639,447	D. \$6,373	1.0
Expenses.....	441,107	458,026	D. 16,919	3.7
Net earnings.....	\$191,967	\$181,421	I. \$10,546	5.8
Gross earn. per mile.....	6.701	6.768	D. 67	1.0
Net.....	2.032	1.920	I. 112	5.8
Per cent. of expenses.....	69.6	71.6	D. 2.0	

The decrease in passenger earnings was mainly due to depression in the manufacturing business along the line, and the unusually small amount of travel by workmen. Taxes are included in expenses.

The result of the year was as follows:

Net earnings, as above.....	\$191,967
Interest paid.....	\$88,829
Dividends on stock.....	78,579
Surplus to profit and loss.....	\$24,559

During the year the road-bed was improved by ballasting and ditching; 1,742 tons of steel rails and 42,261 new ties were used in renewals. The equipment was much improved in condition; four new locomotives were bought, and one old one broken up. Four new iron bridges were built to replace wooden ones.

The traffic for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Pass. train miles.....	222,623	215,150	I. 7,473	3.5
Freight.....	216,114	241,060	D. 24,946	10.4
Total loco. miles.....	544,308	557,938	D. 13,630	2.5
Passengers carried.....	431,142	433,430	D. 2,288	0.5
Tons freight carried.....	7,044,603	7,335,977	D. 291,374	3.9
Tons freight carried.....	495,564	537,968	D. 42,404	7.9
Ton-miles.....	17,017,338	17,338,246	D. 320,908	1.8
Av. train load:				
Passengers, No.....	31.6	34.0	D. 2.4	7.1
Freight, tons.....	78.7	72.0	I. 6.7	9.3

The rate per passenger-mile last year was: Season-ticket, 0.89; local, 3.16; through, 2.72; average, 2.71 cents. The rate per ton-mile was: Local, 3.56; through, 2.10; average, 2.30 cents.

The report refers to the stock dividend of 17 per cent. made Nov. 13 last, which reduces the stock in the treasury to 352 shares. The floating debt has been substantially provided for. The bonded debt can be refunded as it matures (1887-1895) at 4 per cent. The rental under the proposed lease to the Boston & Maine Co. will be \$250,000 yearly; from this dividends of 5½ per cent. can be paid, which can be increased to 6 per cent. when the bonds are refunded.

Milwaukee, Lake Shore & Western.

This company owns a line from Milwaukee, Wis., to Ashland, 397 miles, with branches from Manitowoc to Two Rivers, 7 miles; Hortonville to Oshkosh, 23 miles; Eland Junction to Wausau, 22 miles; Antigo to Malcom, 13 miles; Monico to Rhinelander, 15 miles. It leases (and practically owns) the St. Paul Eastern Grand Trunk, from Clintonville to Oconto, 56 miles, making 533 miles at the close of the year, Dec. 31 last.

Additions during the year were the extension of the main line from Irondeau to Ashland, 42 miles. This extension gives the road a Lake Superior outlet, and enables it to carry ore from the Gogebic Range to Ashland for shipment by lake.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers carried.....	303,265	278,440	I. 24,825	8.9
Passenger-miles.....	11,106,341	10,084,097	I. 1,022,244	10.7
Tons freight carried.....	617,306	432,320	I. 184,986	42.8
Ton-miles.....	50,941,940	38,503,270	I. 12,438,670	32.0

Average rate:
Per passenger-mile..... 3.080 cts. 3.190 cts. D. 0.110 ct. 3.4
Per ton-mile..... 1.822 " 1.875 " D. 0.053 " 2.8

The average passenger journey last year was 36.8 miles and the average freight haul 82.5 miles, against 36.2 and 89.3 miles respectively in 1884.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$928,118	\$723,665	I. \$204,453	28.2
Passengers.....	362,708	321,822	I. 40,886	12.7
Mail, etc.....	74,452	68,829	I. 5,623	8.1

Total.....	\$1,365,278	\$1,114,316	I. \$250,962	22.5
Expenses.....	644,398	743,823	D. 99,425	13.6
Net earnings.....	\$420,890	\$370,493	I. \$50,397	13.6
Gross earn. per mile.....	2.677	2.718	D. 41	1.5
Net.....	825	904	D. 79	8.8
Per cent. of exps.....	69.2	66.8	I. 2.4	

Expenses were increased by the increase of traffic and the

considerable mileage of new road worked last year, as in the previous year.

The result of the year was as follows:

Net earnings, as above.....	\$420,880
Other receipts.....	9,529
Total.....	\$430,419
Interest paid.....	\$342,648
Rentals, etc.....	24,197
Total.....	366,845

Balance, surplus for the year.....\$63,574

Interest paid includes interest on the income bonds. The surplus in 1884 was \$85,913; in 1883 it was \$110,231, the decrease being mainly on account of increased payments for interest.

Peoria, Decatur & Evansville.

This company operates a line from Peoria, Ill., to Evansville, Ind., 248 miles, with a branch to New Harmony, Ind., 6 miles, making 254 miles in all. Of this line 242 miles are owned, 10 miles, from Peoria to Pekin, being leased from the Peoria & Pekin Union Co., and 2 miles, through Decatur, from the Illinois Central. There are 40.28 miles of sidings owned by the company. The report is for the year ending Dec. 31.

The equipment consists of 30 locomotives; 12 passenger, 3 combination and 3 mail and baggage cars; 1,036 box, 199 line box, 99 stock, 177 coal, 126 flat and 16 caboose cars; 1 officers' car, 1 derrick, and 1 pile-driver car.

The general account, condensed, is as follows:

Capital stock.....	\$8,400,000
Funded debt.....	4,845,000
Accounts and balances.....	146,440
Profit and loss.....	74,940
Total.....	\$13,466,380
Road and equipment.....	\$13,343,000
Sundry securities.....	17,000
For purchase of equipment.....	41,500
Materials on hand.....	18,134
Accounts receivable.....	54,641
Cash.....	90,105
Total.....	13,466,380

The funded debt includes \$1,287,000 first-mortgage 6s; \$1,470,000 Evansville Division first 6s; \$858,000 income 6s and \$1,230,000 Evansville Division income 6s.

The earnings for the year were as follows:

1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$472,657	\$478,313	D. 5,556 1.2
Passengers.....	146,662	162,612	D. 15,950 9.8
Mail and express.....	26,260	26,241	I. 19 0.1
Miscellaneous.....	91,406	92,702	D. 1,296 1.4
Total.....	\$736,985	\$759,768	D. \$22,783 3.0
Expenses.....	405,192	440,196	D. 35,004 7.9
Net earnings.....	\$331,793	\$319,572	I. \$12,221 3.8
Gross earn. per mile.....	2,902	2,991	D. 89 3.0
Net ".....	1,306	1,258	I. 48 3.8
Per cent. of exps.....	55.0	57.9	D. 2.9

Earnings were reduced by the decrease in passenger traffic and by the low rates prevailing on through freight business. Taxes are not included in expenses.

The income account is as follows:

Net earnings, as above.....	\$331,793
Taxes and rentals.....	\$64,292
Interest paid.....	185,265
Equipment certificates paid.....	48,000
New construction.....	21,621
Total.....	319,188

Balance, surplus for the year.....\$74,940

Balance, Jan. 1, 1885.....62,335

Total surplus, Dec. 31, 1885.....\$74,940

No interest was paid on the income bonds. The equipment certificates paid were those maturing during the year. The total issue of these certificates was \$480,000, of which \$203,000 have been paid, leaving \$277,000 outstanding.

The traffic for the year was as follows:

1885.	1884.	Inc. or Dec.	P. c.
Pass. train miles.....	209,226	175,781	I. 33,445 19.0
Freight train miles.....	305,128	331,806	D. 26,678 8.0
Total locomotive miles.....	521,025	526,183	D. 5,158 0.9
Pass. car miles.....	807,329	759,651	I. 47,678 6.3
Freight car miles.....	4,691,273	5,115,867	D. 424,594 8.3
Passenger-cars carried.....	236,935	275,533	D. 38,598 13.9
Passenger-miles.....	5,456,844	6,171,509	D. 714,665 11.5
Tons freight carried.....	443,182	427,575	I. 15,607 3.7
Ton-miles.....	43,416,628	42,430,263	I. 986,365 2.3

Av. train load:
Passengers, No.....26.1
Freight, tons.....142.3

Average rate:
Per passenger-mile.....2.69 cts.
Per ton-mile.....1.09 "

Of the freight car mileage last year 75.2 per cent. was of loaded cars. Through freight furnished 44 per cent. of the ton-miles, the average rate on through freight being 0.601 cent and on local 1.47 cents per ton-mile. Through passenger-cars furnished 19.7 per cent. of the passenger-miles, the average through rate being 2.18 and the local 2.81 cents. Locomotive service cost 11.24 cents per mile run.

During the year 500 tons of steel rails and 65,128 new ties were used in renewals. There are still 72 miles of track laid with iron. Four spans of Howe truss and 1,121 ft. of pile bridging were rebuilt.

The corn crop along the line has been very large, promising an increase of traffic from that source, but the wheat crop failed badly, yielding barely enough for home consumption.

Housatonic.

This company owns a line from Bridgeport, Conn., to the Massachusetts line, 74 miles, with a branch from Brookfield Junction to Danbury, 5.5 miles. It leases the Berkshire road, from the state line to West Stockbridge, Mass., 22 miles; the West Stockbridge road, from West Stockbridge to the New York line, 2.75 miles, and the Stockbridge & Pittsfield road, from Vandusenville to Pittsfield, Mass., 25 miles. The total is 79.5 miles owned, 46.75 miles leased and 126.35 miles worked. The report is for the year ending Sept. 30.

The equipment consists of 23 locomotives; 30 passenger and 16 baggage and smoking cars; 533 box, 14 hay, 329 flat and 2 caboose cars; 1 wrecking car.

The capital account is as follows, condensed:

Old stock.....	\$820,000
Preferred stock.....	1,180,000
Funded debt.....	1,096,500
Accounts and balances.....	249,899
Profit and loss.....	233,479
Total.....	\$3,584,878
Road and property.....	\$3,123,669
Rolling stock cars.....	215,793
Materials.....	48,279
Accounts receivable.....	65,037
Cash.....	132,070
Total.....	\$3,584,878

The funded debt includes \$450,000 plain 6s; \$370,000

plain 5s; \$78,500 new 4s and \$200,000 rolling stock 5s. It was reduced \$19,500 during the year.

The traffic for the year was as follows:

1884-85.	1883-84.	Inc. or Dec.	P. c.
Pass. train miles.....	242,192	249,134	D. 7,032 2.8
Freight ".....	274,633	283,417	D. 8,784 3.0
Total loco. miles.....	540,834	557,994	D. 17,160 3.1
Passengers carried.....	340,954	367,080	D. 26,126 7.1
Passenger-miles.....	8,835,567	9,265,561	D. 429,994 4.6
Tons freight carried.....	285,483	290,868	D. 5,385 1.8
Ton-miles.....	14,890,424	14,875,414	I. 15,010 0.1

Av. train load:
Passengers, No.....36.5
Freight, tons.....54.2

The cost per train mile last year was 71 cents. Fuel for locomotives cost 9.2 cents per mile run.

The earnings for the year were as follows:

1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight and milk.....	\$392,958	\$417,342	D. \$24,384 5.8
Passengers.....	220,798	230,230	D. 9,432 4.1
Mail, etc.....	32,104	39,188	I. 7,084 21.0
Total.....	\$645,860	\$676,760	D. \$30,900 4.6
Expenses.....	383,678	472,503	D. 88,825 18.8
Net earnings.....	\$262,182	\$204,257	I. \$57,925 28.4
Gross earn. per mile.....	5.116	5.360	D. 244 4.6
Net ".....	2.426	1.618	I. 458 28.4
Per cent. of expenses.....	59.0	69.8	D. 10.8

Taxes are not included in expenses. A large reduction in expenses was secured last year.

The income account was as follows:

Net earnings, as above.....	\$262,182
Rolling stock cars.....	8,283
Total.....	\$270,465
Interest and rentals.....	\$137,473
Taxes, etc.....	20,846
Dividends on preferred stock.....	87,600
Total.....	245,919

Surplus for the year.....\$29,546

Balance from previous year.....208,933

Total surplus, Sept. 30, 1885.....\$238,479

Dividends paid were 7 per cent., against 8 per cent. in the previous year, two quarterly dividends of 2 and two of 1 1/2 per cent. having been paid.

The 400 rolling stock cars earned \$25,973. Repairs cost \$7,690, and interest on \$200,000 rolling stock certificates was \$10,000, leaving a profit of \$8,283 for the year.

Western North Carolina.

This company owns a line from Salisbury, N. C., to Paint Rock on the Tennessee line, 190 miles, with a branch from Asheville to the Nantahala River, 84 miles, making 274 miles in all. Of this, 280 miles, from Charleston to the Nantahala, though built in 1884, was not brought into operation until the close of the year. The report is for the year ending Sept. 30.

The road is controlled by the Richmond & Danville through the Richmond & West Point Terminal Co.

An extension from the Nantahala to Jarratt's, 12 miles, which was under construction during the year, has been completed since its close (Nov. 23) and opened for traffic. This makes 286 miles now owned and worked.

The general account, condensed, is as follows:

Capital stock.....	\$8,000,000
Funded debt.....	7,535,000
Accounts and balances.....	350,360
Total.....	\$15,885,360
Road and property.....	\$15,645,861
Materials on hand.....	15,764
Accounts receivable.....	68,805
Cash.....	40,355
Profit and loss, debit balance.....	76,584
Total.....	15,885,369

The funded debt includes \$850,000 first-mortgage bonds; \$2,575,000 consolidated bonds, and \$4,110,000 second consolidated bonds. It is \$26,346 per mile of road. The cost of property reported is \$54,845 per mile of road.

The earnings for the year were as follows:

1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight.....	\$236,574	\$263,329	I. \$26,755 11.3
Passengers.....	150,527	145,227	I. 5,300 3.6
Mail, etc.....	31,406	26,513	I. 4,893 18.5
Total.....	\$468,507	\$435,069	I. \$33,438 7.7
Expenses.....	324,351	293,486	I. 30,865 10.5
Net earnings.....	\$144,156	\$141,583	I. \$2,573 1.8
Gross earn. per mile.....	1.845	2.112	D. 267 12.7
Net ".....	508	687	D. 179 17.3
Per cent. of exps.....	69.0	67.5	I. 1.5

Taxes are included in expenses. Regular trains on the Murphy Branch were run only to Charleston, 64 miles from Asheville, the 20 miles from Charleston to the Nantahala not being opened for traffic until after the close of the year, although completed.

The disposition of net earnings was as follows:

Net earnings, as above.....	\$144,156
Interest on bonds other than those held by Rich. & West Pt. Terminal Co.....	\$134,500
Interest on floating debt.....	11,421
Total.....	145,921

Deficit for the year.....\$1,765

Settlement of Terminal Co. accounts for advances.....438,646

Total debit.....\$440,411

Credit balance, October 1, 1884.....\$343,937

Balance of credits, sundry accounts.....19,890

Total..... 363,827

Debit balance, Sept. 30, 1885.....\$76,584

Expenditures for construction during the year were \$75,809, and for equipment \$9,115; a total of \$84,924 for additions to property.

The traffic reported is as follows:

1884-85.	1883-84.	Increase.	P. c.
Train-miles.....	462,733	462,733	0.0
Passengers carried.....	107,850	101,445	6,405 6.3
Tons freight carried.....	104,160	95,847	8,313 8.7

The train mileage last year was made up as follows: Passenger, 190,538; freight and mixed, 240,476; service and switching, 61,719; total, 492,733. Locomotive service cost 18.6 cents per mile run. The average freight train on the main line was 14 cars; on the Murphy Branch, 4 1/2 cars. The earnings per passenger train mile were \$0.94; per freight train mile, \$1.98.

The report says: "The result of the work already accomplished and that in progress will be to give an outlet to the counties of Graham, Cherokee, Clay and a large part of Macon. These have heretofore, for the most part, sought their markets in the states of Georgia and Tennessee. It is true that this section west of Charleston is at present but sparsely settled and its agricultural products are not very considerable, but increasing attention is being directed to its

important natural advantages. The immense marble and slate deposits on the Nantahala River, the valuable beds of iron ore in Cherokee, the mountains covered with timber, the inexhaustible water-power and the magnificent range for cattle, all combine to render the rapid development of the section traversed by this extension as certain as human foresight can predict. Inquiries are daily made at the State Agricultural Department in regard to the western portion of the state, the capital of non-residents is being invested, settlers are arriving, saw-mills and other industries are springing up.

The Legislature of the state, recognizing the imperative needs of the people of this region and the great future that railroad development will give their industry, has wisely granted aid in the way of convict labor to the extension of the road from Nantahala River westward.

The want of a hotel at that famous summer resort, the Warm Springs, in Madison County, and the burning of White Sulphur Springs Hotel near Waynesville, largely limited the natural increase of the passenger travel during the past season. The hotel at Warm Springs is being rebuilt upon a larger scale. A new brick hotel at the White Sulphur Springs is also under construction, and a large and handsome hotel is about to be added to the attractions at Asheville. We have a right, therefore, to expect, with these additions to the attractive resorts of Western North Carolina, an increase in our passenger traffic for the succeeding year.

By Jan. 1, 1886, the railroad from Asheville to Hendersonville will be completed and through connections given via Spartanburg to Southern traffic. This will undoubtedly add materially to the business between Asheville and Paint Rock."

Cleveland & Canton.

This company owns a line from Cleveland, O., to Coshocton, 115 miles, with branches from Oneida to Minerva, 3 miles, and from Canton to Sherrodsville, 43 miles, making a total of 161 miles. It is of 3 ft. gauge.

The road was formerly the Conotton Valley, and passed to the present company last year through foreclosure. The first report covers the half year from July 1 to Dec. 31 last.

The earnings for the half year were as follows:

Gross earnings (\$922 per mile).....	\$148,469
Expenses (80.8 per cent.).....	120,031
Net earnings (\$177 per mile).....	\$28,438
Received on Co.'s note.....	72,093
Total.....	\$100,531

Old claims, Receiver, etc.....\$56,750
Reorganization expenses.....21,156
New construction.....21,313

Balance..... 99,219

Balance..... \$1,312

The report sets forth that the directors assumed control of the property July 1, 1885, but, owing to unreasonable delay on the part of the reorganization trustees, the company did not obtain a complete title to the property until some five months later. This fact greatly embarrassed the directors in the management of the property, and prevented the adoption of improvements, which, however, have now been adopted in part, and are beginning to bear fruit in increased net earnings. Two of the three trustees were willing to convey the property to the company at once, but it was not until Dec. 4, 1885, after objection upon objection had been raised and disposed of, that the third trustee would consent to the execution of the deed. The instrument has now been fully recorded. At the time of the delivery of the deed the company paid to the Receiver and Special Master Commissioner the sum of \$43,250, and relieved the trustees from all liability on the purchase made by them.

The directors set forth at length a plan for the issue of new special preferred stock for the purpose of changing the gauge and buying terminal property, which is referred to elsewhere.

Columbus, Hocking Valley & Toledo.

This company owns a line from Toledo, O., through Columbus to Pomeroy, 257 miles, with 67 miles of branches, a total of 324 miles. The following brief statement is for the year ending Dec. 31 last:

The company has \$11,700,500 stock and a funded debt amounting to \$14,741,000, including \$6,741,000 divisional 7s and \$8,000,000 consolidated 5s. The consolidated mortgage is for \$14,500,000, the unissued \$6,500,000 being reserved to retire the divisional bonds.

The earnings for the year were as follows:

1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$1,755,723	\$1,295,069	I. \$460,654 35.6
Passengers.....	357,278	390,994	D. 33,716 8.6
Mail, etc.....	198,002	159,409	I. 38,593 24.1
Total.....	\$2,311,003	\$1,845,472	I. \$465,531 25.2
Expenses.....	1,264,708	1,240,654	I. 24,054 1.9
Net earnings.....	\$1,046,295	\$604,818	I. \$441,387 72.9
Gross earn. per mile.....	7.133	5.696	I. 1,437 25.2
Net ".....	3.229	1.867	I. 1,362 72.9
Per cent. of exps.....	54.7	67.2	D. 12.5

The earnings last year show a remarkable gain, which was it is understood, chiefly due to an increase in the coal business, which forms the larger part of the traffic of the road.

The expenses for the two years were divided as follows:

1885.	1884.	Amount.	P. c.
Maintenance of way.....	\$256,301	11.1	\$269,419 14.6
Motive power and cars.....	159,534	6.9	131,537 7.1
Conducting transportation.....	736,772	31.9	641,144 34.7
General operating.....	112,191	4.8	108,554 10.8
Total.....	\$1,264,798	54.7	\$1,240,654 67.2

The interest charge on the funded debt is \$871,870 yearly. Deducting this from the net earnings last year, there remains a balance of \$174,335, which is equal to 1.49 per cent. on the stock.

St. Louis & San Francisco.